METHOD FOR CONSTRUCTING MODULAR SHELTERS USING RECYCLED LAND/SEA SHIPPING CONTAINERS

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ABSTRACT

A method of constructing modular, multi-use, enclosed shelters by recycling modular shipping containers, including the steps of determining a desired type of enclosed shelter module compatible with the dimensions of a modular shipping container, determining structural and functional components necessary for the selected type of enclosed shelter module, packing the structural and functional components into the modular shipping container, transporting the packed shipping container to a site selected for the enclosed shelter module, unpacking the structural and functional components from the shipping container, and assembling the structural and functional components into and onto the shipping container to convert the shipping container into the desired type of enclosed shelter module. Modular, multi-use enclosed shelters may be constructed by assembling a plurality of shipping containers converted into one or more types of enclosed shelter modules into a multi-element structure, wherein each element of the structure is comprised of a converted shipping container and the shipping containers are joined by means of the mechanisms normally provided to interlock multiple modular shipping containers during shipping.

5' PIC UNIT FIXED

GAS COOK TOP 25" WIDE
6068 SLDOOR

CABINET SHELVES

M BATH 5'4 x 8'6

5.4CF U.C. FRIDGE 22" WIDE
METHOD FOR CONSTRUCTING MODULAR SHELTERS USING RECYCLED LAND/SEA SHIPPING CONTAINERS

CROSS REFERENCES TO RELATED APPLICATIONS

[0001] 1. Field of the Invention

The present invention is directed to a method for constructing modular shelters, such as residences or offices using recycled sea/land shipping containers for both the transportation of residential or office module building supplies and as the basic structure for a residential or office module and wherein various modules may be assembled to provide multiple interconnected residential or office spaces.

[0002] 2. Background of the Invention

There is a present and historic need for sturdy, relatively inexpensive, readily shipable, enclosed, human inhabitable shelters having one or more interior spaces for housing, offices or other purposes that may be readily constructed by either skilled or unskilled labor, that may be adapted to a wide range of purposes, sites and environments and that can readily survive the rigors of transportation under a wide range of conditions. It is also preferable that such shelters be at least capable of assuming a modular form having one or more sets of standardized dimensions for facility in shipping. The reuse or recycling of elements, structures or materials, including those originally intended for other purposes is also desirable for economic and environmental reasons.

[0003] Such shelters may be employed for a wide range of purposes, such as vacation homes, hunting and fishing lodges, wilderness shelters and temporary or long term laboratory/medical/housing facilities, particularly in remote sites, and low cost housing and office space. Other exemplary applications include emergency housing, office and laboratory facilities for areas affected by natural or man-made disasters and short or long term housing, office and laboratory facilities in developing areas.

[0004] Another and apparently unrelated problem arises from the very common situation of trade shipment imbalances between countries or even between areas of a country. That is, certain countries or locales, often those offering low labor costs, tend to be sources of goods, most often including consumer goods such as vehicles, cars, furniture, electronic components and products, food and flowers, while other countries or locales tend to be importers of such goods and to ship a relatively smaller volume of goods in return. Such situations commonly result in a shipping imbalance wherein “empties”, that is, the means by which the goods are shipped, either accumulate at the receiving locale or shipped back empty to the source locale. The return of empty shipping containers is often regarded as uneconomical, whether the “empties” are packing containers, trucks, rail cars or ships. Therefore, and unless the involved industry has developed a specific method to deal with the costs of returning empties, such as carrying the return costs as part of the original shipping costs or developing a return market to minimize the volume of empty shipping, the “empties” tend to merely accumulate at the receiving end. It will be recognized, therefore, that the non-return and accumulation of “empties” represents a significant lost investment in raw materials and construction costs.

[0005] For example, a very common method of shipping goods by sea, rail or truck is the use of “sea/land” containers, which are rugged, standardized containers that are typically multiples of 20 in length by 8 feet wide and high with a pair of bolt latched doors at one end. The containers include interlock mechanisms at each corner, thereby allowing the containers to be stacked or otherwise secured joined to one another on, for example, the deck of a ship, on a railcar or on a truck, and are typically constructed of heavy gauge steel. The accumulation of empty, unreturned sea/land shipping containers is a particularly significant problem as the containers are manufactured in significant quantities and are sufficiently inexpensive to be commonly used in “one way” trades but, because of the number of containers involved in such trades, represent significant unrecovered value in both raw materials and construction costs.

[0006] The present invention provides a solution to the apparently unrelated problems, and to other similar and related problems of the prior art.

SUMMARY OF THE INVENTION

[0007] The present invention is directed to a method for recycling modular shipping containers to provide shelters wherein the methods includes the steps of determining a type of enclosed shelter compatible with the standardized, modular dimensions of a shipping container, determining structural and functional components necessary for the selected type of enclosed shelter, packing the structural and functional components into the shipping container, transporting the packed shipping container to a site selected for the enclosed shelter, unpacking the structural and functional components from the shipping container, and assembling the structural and function components into and onto the shipping container to convert the shipping container into the desired type of enclosed shelter.

[0008] The method of the present invention may further include the assembly of a plurality of shipping containers converted into one or more types of enclosed shelters into a multi-element structure, wherein each element of the structure is comprised of a converted shipping container and the shipping containers are joined by means of the mechanisms normally provided to interlock multiple shipping containers during shipping.

[0009] The present invention is also directed to a method of constructing modular, multi-use enclosed shelters, including the steps of determining a desired type of enclosed shelter module compatible with the dimensions of a modular shipping container, determining structural and functional components necessary for the selected type of enclosed shelter module, packing the structural and functional components into the modular shipping container, transporting the packed shipping container to a site selected for the enclosed shelter module, unpacking the structural and functional components from the shipping container, and assembling the structural and function components into and onto the shipping container to convert the shipping container into the desired type of enclosed shelter module.

[0010] Again, this method may be used to construct modular, multi-use enclosed shelters by assembling a plurality of shipping containers converted into one or more types of enclosed shelter modules into a multi-element structure, wherein each element of the structure is comprised of a
converted shipping container and the shipping containers are joined by means of the mechanisms normally provided to interlock multiple modular shipping containers during shipping.  

[0013] Other features, objects and advantages of the present invention will be understood by those of ordinary skill in the relevant arts after reading the following descriptions of a presently preferred embodiment of the present invention, and after examination of the drawings, wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a general diagram of a Container 10, such as a sea/land shipping container;  
[0015] FIG. 2 is a flow diagram illustrating the recycling of Containers 10 into shelters;  
[0016] FIG. 3A is a plan of a container recycled into an exemplary shelter; and  
[0017] FIGS. 3B and 3C are side plan views of containers recycled into exemplary shelters.

DESCRIPTION OF THE INVENTION

[0018] Referring to FIG. 1, therein is shown a diagrammatic representation of a Sea/Land Shipping Container (Container) 10 having two Side Walls (Sides) 10S, two End Walls (Ends) 10E, a Top Wall (Top) 10T and a Bottom Wall (Bottom) 10B. As is well known in the art, a Container 10 is typically of standardized dimensions, such as multiple of 20 feet in length by 8 feet wide and 8 feet high, to permit the stacking and interlocking of multiple Containers 10, and is typically provided with Interlocks 10I at each corner to allow stacked or otherwise arranged Containers 10 to be securely joined one to another. Also, one End 10E is typically comprised of a pair of hinged Doors 10D securable by Lock Bolts (Bolts) 10L. Containers 10 are typically constructed of heavy gauge steel and are thereby structurally strong and rugged and, together with the facility for securely locking the Containers 10 by means of Doors 10D and Bolts 10L, provide secure protection to the contents of a Container 10 against a wide range of environmental and physical rigors, including physical force, water and fire.  

[0019] As illustrated in FIG. 2, the present invention provides a method by which Containers 10 are recycled to provide sturdy, relatively inexpensive, shipable, enclosed, modular shelters that may be used, for example, for housing, offices or other purposes, that may be readily constructed by skilled or unskilled labor, that may be adapted to a wide range of purposes, sites and environments, and that can readily survive the rigors of transportation under a wide range of conditions. Such shelters may typically be designed and constructed for functions or purposes requiring that they be human inhabitable for brief or extended periods, or may be designed and constructed for purposes whose primary requirement is other than human habitability, such as remote or local equipment shelters or storage facilities. It will also be noted that a shelter or structure based upon one or more Containers 10 do not require extensive foundations, such as concrete foundations, due to the inherent structural strength of the Containers 10. That is, Containers 10 do not require concrete or similar foundation walls as a primary component of the structural strength of the structure.

[0020] According to the present invention, and as described further in the following, a Container 10 that has fulfilled its initial purpose; that is, the shipping of goods from one locale to another, is modified into a Shippable Module 12 wherein the Container 10 is used both as the Basic Structure 14 of a Shelter Module 16, that is, to provide the walls, roof and floor of the Shelter Module 16, and as the shipping Container 10 for all Components 18 required to fit the Basic Structure 14, that is, the Container 10, to the desired purposes as a Shelter Module 16.  

[0021] Components 18 may include, for example, door or window units, exterior siding, interior wall and insulation panels, floor coverings, fixtures such as cabinets, sanitary facilities and so on, and utility components such as wiring and plumbing elements. Any of Components 18 may be provided in a range of forms, depending upon the skill levels of the anticipated constructors. For example, as illustrated in FIG. 3A, certain Components 18 may be provided in fully assembled, modular form, such as windows, doors, cabinets and sanitary fixtures such as toilets, basins and bath/shower units, requiring only that the units be put in place, such as in an appropriate opening cut in a wall, and fixed in place by a means suitable to the component and the assembler, such as nails, screws, bolts or adhesives. At least some utilities, such as power wiring and plumbing, may also be provided and assembled as modular units, assuming that the layout of the Shelter Module 16 is defined and known before the Module 12 is assembled. In the same manner, interior wall, roof, ceiling and floor components and insulation may be provided as pre-assembled modules requiring only that the modules be moved into place and installed by, for example, nails, screws or adhesives. In other instances, certain interior Components 18, such as flooring, ceiling or wall components maybe installed when a Module 12 is originally assembled for shipment and, in other instances, and particularly when more skilled workers are available, at least some Components 18, such as wiring and plumbing elements or floor, ceiling and wall elements, may be provided as “raw materials” or basic components rather than as modular, preassembled or preformed elements. In summary, the only fixed requirement imposed on the forms that may be assumed by Components 18 is that the Components 18 fit within the Module 12. Otherwise the nature, type and form of Components 18 is determined by the intended function of the Shelter Module 16, the expected or defined environmental and site conditions, the skill of the available work force, and so on.

[0022] As illustrated in FIGS. 3B and 3C, two or more of one or more types of Shelter Modules 16 may be assembled together using the corner Interlocks 10I standard on Containers 10, such as Sea/Land containers, to lock the Shelter Modules 16 into the desired side-by-side and/or stacked configuration to thereby construct a Multi-Unit Structure 20 of any desired configuration. Multi-Unit Structures 20 may include, for example, an office unit comprised of multiple office units with a kitchen/lounge/sanitary facilities unit or a housing unit comprised of a kitchen/common room/sanitary facility and one or more sleeping or residence units. The addition of one or more laboratory or clinical units to such a Multi-Unit Structure 20 would, in turn, create a clinic or research station, and so on, while the addition of Shelter Modules 16 having other Components 18 could result, for example, in a prison or jail facility, a communications facility or a store, and so on.
For example, and as indicated in FIG. 3, when Shelter Modules 16 are joined on a horizontal plane, interior passages between Shelter Modules 16 may be provided by suitable matching openings made in the adjacent Shelter Modules 16 and door or door frame Components 18 in the openings that mate to provide a passage sealed against the outside environment. In a like manner, when Shelter Modules 16 are joined or stacked vertically, interior passages between vertically joining Shelter Modules 16 may again be provided by suitable matching openings in the ceiling of the lower unit and the floor of the upper unit and a stairway Component 18 installed for passage between the Shelter Modules 16. In the alternative, when desired or necessary, passage between vertically joining Shelter Modules 16 may be provided by means of exterior door Components 18 joined by an exterior stair unit Component 18. Other facilities connecting between adjoining Shelter Modules 16, such as plumbing, sanitary connections, power or communications wiring and connections, heat/ventilation/air conditioning ducting and so on may be provided in a similar manner, that is, by matching openings made in the Shelter Modules 16 with appropriate Components 18 to seal the openings as necessary.

Lastly, a Module 12 may include drawings for assembly into a Shelter Module 16 and verified according to local codes and requirements. In an alternative, and particularly in regions lacking skill labor used to construction, guidelines for the assembly of a Module 12 into a Shelter Module 16 may be provided by, for example, stenciling on the interior surfaces to locate and dimension, for example, window and door openings, the locations of interior elements, such as wiring, plumbing, interior divider walls, toilets, and so on. In yet further alternatives, the required openings, mountings and assemblies may be made by medium to high level skilled workers using, for example, cutting torches, power saws and drills and so on. In the instance of relatively low skill workers or a lack of appropriate assembly tools, some elements, such as window, door and plumbing openings may be formed at the assembly of a Module 12 as "knock out" panels, making appropriate allowance for the rigors of transportation and assembly.

In conclusion, while the invention has been particularly shown and described with reference to preferred embodiments of the apparatus and methods thereof, it will be also understood by those of ordinary skill in the art that various changes, variations and modifications in form, details and implementation may be made therein without departing from the spirit and scope of the invention as defined by the appended claims. Therefore, it is the object of the appended claims to cover all such variation and modifications of the invention as come within the true spirit and scope of the invention.

What is claimed is:

1. A method for recycling modular shipping containers, comprising the steps of:

- determining a type of enclosed shelter compatible with the standardized, modular dimensions of a shipping container;
- determining structural and functional components necessary for the selected type of enclosed shelter;
- packing the structural and functional components into the shipping container;
- transporting the packed shipping container to a site selected for the enclosed shelter;
- unpacking the structural and functional components from the shipping container; and
- assembling the structural and function components into and onto the shipping container to convert the shipping container into the desired type of enclosed shelter.

2. The method of claim 1 for recycling modular shipping containers, further comprising the steps of:

- assembling a plurality of shipping containers converted into one or more types of enclosed shelters into a multi-element structure, wherein each element of the structure is comprised of a converted shipping container and the shipping containers are joined by means of the mechanisms normally provided to interlock multiple shipping containers during shipping.

3. A method of constructing modular, multi-use enclosed shelters, comprising the steps of:

- determining a desired type of enclosed shelter module compatible with the dimensions of a modular shipping container;
- determining structural and functional components necessary for the selected type of enclosed shelter module;
- packing the structural and functional components into the modular shipping container;
- transporting the packed shipping container to a site selected for the enclosed shelter module;
- unpacking the structural and functional components from the shipping container; and
- assembling the structural and function components into and onto the shipping container to convert the shipping container into the desired type of enclosed shelter module.

4. The method of claim 3 for constructing modular, multi-use enclosed shelters, further comprising the steps of:

- assembling a plurality of shipping containers converted into one or more types of enclosed shelter modules into a multi-element structure, wherein each element of the structure is comprised of a converted shipping container and the shipping containers are joined by means of the mechanisms normally provided to interlock multiple modular shipping containers during shipping.

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