A shelter is manufactured at a first location then transported to the installation location on a transport device.
STORM SHELTER AND VAULT WITH TRANSPORT SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

[0001] We hereby claim the benefit under Title 35, United States Code, § 119(e) of U.S. provisional application No. 60/522,277 filed Sep, 9, 2004.

BACKGROUND OF THE INVENTION

[0002] Storm shelters have long been used for protection from tornadoes, hurricanes and the like. Typical storm shelters are enclosures buried in the ground, which suffer from numerous drawbacks, including high installation expense, water intrusion, distance from the main dwelling, outdoor access, and stairs for entry and exit. Another type of shelter is a specially-hardened room or closet in a dwelling which eliminates many drawbacks of the buried type of shelter, but this type of shelter has its own drawbacks, including high cost of construction and specialized construction techniques required. A hard room shelter is most readily included in a new construction, but this presents construction scheduling problems, because the typical new home construction is on a tight schedule of construction phases. Incorporation of a shelter requires the installation at a particular point in the construction by a crew that specializes in such shelters, typically with a crane. It is almost impossible to retrofit a hard room into an existing structure.

[0003] Kit-type shelters are known, where the shelter is constructed on-site from pre-cast panels. This type of shelter is expensive, difficult to manufacture with the required strength and precision, and difficult to transport and erect on-site.

[0004] One aspect of the present invention is a shelter that is cast of concrete in one piece at a manufacturing location, then transported to the site using specialized equipment, then joined to the floor slab using an adhesive. The shelter has a roof, two side walls, a back wall, a door forming substantially the entire front, and an open floor. The dwelling slab becomes the floor of the shelter once the shelter is adhesively joined to the slab.

[0005] Another aspect of the present invention is the transport system for installing the shelter. The shelter is quite heavy, being a room sized structure made of reinforced concrete. Vertical height should be maximized for occupant comfort. It must be transported from the manufacturing site to the installation site, then precisely positioned through, typically, a relatively low garage door opening before being set down and joined to the slab. Thus to move and position the shelter, a specialized transport device lifts the shelter slightly off the surface, moves it horizontally into position, then lowers it, and then the transport device is removed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 shows an installed shelter of the present invention and an occupant.

[0007] FIG. 2 shows the shelter of FIG. 1 installed in the corner of a room, such as a garage.

[0008] FIG. 3 shows the shelter on a trailer ready to be transported to the installation site.

[0009] FIG. 4 shows the shelter being moved onto the trailer by the transport device of the present invention.

[0010] FIG. 5 shows the shelter being moved through a garage door opening on the transport device.

[0011] FIG. 6 is a perspective view of the transport device.

[0012] FIGS. 7-12 show the sequence of lifting the shelter with the transport device, which is reversed to lower the shelter. FIG. 11 is a partial cross-section taken along lines 11-11 of FIG. 10.

DETAILED DESCRIPTION

[0013] Referring initially to FIGS. 1-12 where like numerals indicate like and corresponding elements, shelter 10 is essentially a concrete box adhesively-sealed to a concrete garage floor 12, with a door 14, two side walls 16,18 (FIG. 5), a back wall 20, and a roof 22. Door 14 makes up substantially all of the front wall 24. The shelter 10 is sized to comfortably protect one or more occupants 26. Locks 28 and a handle 30 are provided. Interior benches 32 provide seating and survival gear storage. Ventilation (not shown) is provided.

[0014] The invention is not the provision of a shelter per se, but rather the advantageous method and apparatus for transporting the shelter. The shelter is typically pre-manufactured off site, then expeditiously transported to and installed at the home site. It will be appreciated that during new home construction, other building activity will be interrupted during installation of the shelter, so speed is essential. In retrofit installations, inconvenience to the homeowner must be minimized by installing the shelter quickly.

[0015] As shown in FIG. 3, shelter 10 is sized to be conveniently transported on a trailer 50. FIG. 4 shows the shelter 10 being loaded/unloaded from trailer 50 by a specialized transport device 52. A key feature of transport device 52 is that it lifts shelter 10 a short distance off the ground from within, as shown in FIG. 5. This enables the shelter 10 and transport device to be inserted through garage door opening 54, which typically is only seven feet high. The height of garage door opening 54 is the limiting factor on how tall the shelter 10 can be.

[0016] As shown in FIG. 6, transport device 52 includes a metal framework composed of columns 100,102,104,106, lower transverse beams 108,110, upper transverse beams 112,114, longitudinal beams 116,118,120,122, and diagonal braces 124,126. Wheels 128 support the framework. A steering mechanism 130 is connected to one pair of wheels 128. An electric motor drive 132 connected to the other pair of wheels enables horizontal movement of the transport device 52 and shelter 10. Jack retainer bars 134 are located at the tops of columns 100,102,104,106. Feet 136 are generally L-shaped with a hook 138 at the top edge. Hooks 138 removably engage lips 140 at the bases 142 of the columns 100,102,104,106.

[0017] As shown in FIG. 7, transport device 52 is sized to roll into shelter 10 under the roof 22 and between the side walls 16,18. Shelter 10 at that point is supported by floor 148. Then, as shown in FIG. 8, hydraulic jacks 150 are placed on the tops of columns 100,102,104,106 and held in
place by jack retainer bars. Wooden beams 152 straddle pairs of jacks 150. FIG. 9 illustrates shelter 10 lifted off of floor 148 by the extensions of jacks 150. Wooden beams 152 support shelter 10 on jacks 150.

[0018] As shown in FIGS. 10-12, optional feet 136 may be used to support the shelter 10 on transport device 52 by engaging hooks 138 on lips 140, then lowering the jacks slightly so that weight of the shelter is borne by feet 136. This reduces or removes the load on wooden beams 152 and the roof 22, thereby enabling support on the bottom edges 154 of side walls 16, 18, which may be better suited for support of the shelter 10 during transport. Feet 136 may be omitted if the shelter 10 is strong enough in the roof section to be supported from the inside of the roof during transport.

[0019] An example of the shelter has been tested and found to give protection in an F-5 tornado. The shelter is constructed to F.E.M.A. publication 320 standards.

[0020] In operation, the in-home shelter of the present invention is quicker to access than a buried outdoor structure, which eliminates delayed action by the occupants not having to venture outdoors during severe weather conditions. The shelter is easy to use by all ages, because it has no stairs or other cumbersome features and is wheelchair accessible. The shelter is safer due to the fact it is inside the home and prevents exposure to hail preceding a tornado or from being unable to close the door in high winds. The shelter doubles as a permanent and lockable storage vault with storage provided both inside and on top of the shelter. The shelter is easy to install. The shelters are uniformly high in strength and precision, being manufactured under factory controlled conditions. The shelter can include a light, bench, telephone, television, radio and ventilation. The shelter may be painted inside and outside for aesthetic considerations.

What is claimed is:

1. A method of installing a shelter, comprising the steps of manufacturing the shelter at a first location, then transporting the shelter to an installation location on a transport device, the transport device adapted and sized to be inserted into the shelter and lift the shelter from a roof of the shelter.

2. A transport device for a shelter comprising a framework, wheels at the bottom of the framework, lifting devices at the top of the framework, and the framework sized to be inserted through a door opening of the shelter.

3. The transport device of claim 2 with removable feet for supporting the shelter by bottom edges of side walls of the shelter.

4. The transport device of claim 3 with the feet being generally L-shaped, with hooks at the tops of the feet engaged with lips on the framework.

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