CUSTOMIZABLE SAFEROOM AND METHOD FOR MAKING SAME

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Abstract

According to one embodiment of the invention, a customizable saferoom includes a ceiling panel, a first wall panel having a first set of dimensions, a second wall panel having a second set of dimensions, a third wall panel having a third set of dimensions, and a fourth wall panel having a fourth set of dimensions. Each of the ceiling panel and the first, second, third, and fourth wall panels are coupled to at least one other of the ceiling panel, the first, second, third, and fourth wall panels to form an enclosed structure. The first, second, third, and fourth sets of dimensions are selected to optimize the volumetric capacity of the enclosed structure within the confines of a pre-existing space within a building.
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RELATED APPLICATION


TECHNICAL FIELD OF THE INVENTION

[0002] This invention relates to saferoom construction, and more particularly to a customizable saferoom for assembly in irregular and existing spaces and method for making same.

BACKGROUND OF THE INVENTION

[0003] Saferooms, which may be installed in residences, businesses, and other buildings, are used to shelter inhabitants from violent storms and intruders. In contrast, to a storm shelter, which is generally constructed below the ground’s surface and is external to the building with which it is associated, a saferoom forms a secure space within the internal confines of the building. Although a saferoom may be constructed above or below the building’s foundation, such construction is difficult where the building is a pre-existing structure and, thus, must be adapted for the inclusion of the saferoom.

SUMMARY OF THE INVENTION

[0004] According to one embodiment of the invention, a customizable saferoom includes a ceiling panel, a first wall panel having a first set of dimensions, a second wall panel having a second set of dimensions, a third wall panel having a third set of dimensions, and a fourth wall panel having a fourth set of dimensions. Each of the ceiling panels and the first, second, third, and fourth wall panels are coupled to at least one other of the ceiling panel, the first, second, third, and fourth wall panels to form an enclosed structure. The first, second, third, and fourth sets of dimensions are selected to optimize the volumetric capacity of the enclosed structure within the confines of a pre-existing space within a building.

[0005] Particular embodiments of the present invention provide one or more technical advantages. Some embodiments may benefit from some, none, or all of these advantages. One technical advantage may be that a customizable saferoom may be assembled beneath a stairwell or in another irregularly shaped space of an existing structure. As a result, an existing structure may be adapted to include a saferoom in a closet or other wasted, and possibly previously inaccessible, space beneath a stairwell. Another technical advantage may be that the structural integrity of the space may be improved by the inclusion of the customizable saferoom. For example, the additional structure of the customizable saferoom may be resistant to displacement during a tornado or other violent storm. As a result, the customizable saferoom may protect inhabitants of the customizable saferoom from being picked physically displaced by the storm. Additionally, the customizable saferoom may protect inhabitants from debris circulating in the air during the storm. A further technical advantage may be that the customizable saferoom may be used for purposes other than for protection against tornadoes and other violent storms. For example, because a customizable saferoom provides a secure area within a dwelling or other building, a customizable saferoom may be used as a panic room to protect inhabitants of the building in the case of an invasion.

[0006] Other technical advantages may be readily apparent to those skilled in the art from the following figures, description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] For a more complete understanding of the present invention and for further features and advantages, reference is now made to the following description, taken in conjunction with the accompanying drawings, in which:

[0008] FIG. 1 is a schematic diagram illustrating an exterior view of a customizable saferoom, according to an embodiment of the present invention;

[0009] FIGS. 2A-2C are schematic diagrams illustrating various panels and components for forming a customizable saferoom, according to an embodiment of the present invention;

[0010] FIGS. 3A and 3B are schematic diagrams illustrating example arrangements of sidewall and endwall panels for the assembly of a customizable saferoom, according to certain embodiments of the present invention; and

[0011] FIG. 4 is a schematic diagram illustrating an interior view of a secure ingress within a customizable saferoom, according to an embodiment of the present invention.

DETAILED DESCRIPTION

[0012] It is generally recognized that a closet or other interior room without windows is the safest room in the house for seeking shelter from a violent storm. This is especially true of the space that lies immediately below a stairwell since the stairwell is generally able to withstand greater wind speeds in a violent storm such as a tornado. The structural integrity of the space may be improved, however, with the inclusion of a customizable saferoom. FIG. 1 is a schematic diagram illustrating an exterior view of a customizable saferoom 10, according to an embodiment of the present invention. As illustrated, customizable saferoom 10 is configured for assembly in a pre-existing space such as under a stairwell 24 or within another small space. The additional structure added by customizable saferoom 10 is resistant to displacement during a tornado or other violent storm. As a result, customizable saferoom 10 may protect inhabitants of customizable saferoom 10 from being picked up and tossed around during the storm. Additionally, customizable saferoom 10 may protect inhabitants from debris circulating in the air during the storm. Furthermore, because customizable saferoom 10 provides a secure area within a dwelling or other building, customizable saferoom 10 may be used as a panic room to protect inhabitants of the building in the case of an invasion.

[0013] Customizable saferoom 10 includes a plurality of panels 12 formed of heavy gauge steel or another suitable high-strength material. Such panels 12 may include one or more ceiling panels 12a, one or more sidewall panels 12b, one or more endwall panels 12c, and one or more floor panels (not shown). As will be described in more detail with regard to FIGS. 2A-2C, panels 12 may be C-shaped,
U-shaped, L-shaped, I-shaped, flat, or any combination of the above. In particular embodiments, the shape of each panel 12 may be selected based on its ability to be coupled to other panels 12 and to any other components of customizable saferoom 10. In particular embodiments, panels 12 may be on the order of ¼” thick. In other embodiments, panels 12 may be on the order of ⅛” thick. It is recognized, however, that all dimensions described in this document are provided for example purposes only; any appropriate dimensions may be used in the construction of customizable saferoom 10 and its components. Accordingly, customizable saferoom may include panels 12 of any thickness suitable for providing a desired amount of structural integrity to withstand violent storms or intrusions.

[0014] Customizable saferoom 10 also includes one or more frame portions 14 for coupling panels 12 to one another and to other components of customizable saferoom 10. Frame portions 14 may be formed of heavy gauge steel or another suitable high-strength material. As illustrated in FIG. 1, customizable saferoom 10 includes two frame portions 14a and 14b. In particular embodiments, a first frame portion 14a may comprise one or more L-shaped pieces that are configured to couple customizable saferoom 10 to a foundation 18 or other supporting structure. Thus, first frame portion 14a may form the base frame of customizable saferoom 10. A second frame portion 14b may form a ceiling frame for customizable saferoom 10 and may be configured similarly to first frame portion 14a. Thus, second frame portion 14b may include one or more L-shaped pieces that are configured to couple to any sidewall panels 12b, endwall panels 12c, or ceiling panels 12a, as is appropriate.

[0015] To provide structural integrity to customizable saferoom 10, frames 14 and panels 12, which form customizable saferoom 10, are coupled to one another using a plurality of high-strength fasteners 20 and 22. In particular embodiments, fasteners 20 and 22 may include bolts and nuts, rivets, welding, or other suitable high-strength fasteners. In particular embodiments, fasteners 20 and 22 may include bolts and nuts having a diameter on the order of ⅛ inch. However, the dimensions of fasteners 20 and 22 are provided for example purposes only; it is generally recognized that any type and size of high strength fastener that is suitable for providing structural integrity to the components of customizable saferoom 10 during a violent storm or intrusion may be utilized for the construction of customizable saferoom 10.

[0016] To accommodate high strength fasteners 20 and 22, first and second frame portions 14a and 14b may include preformed holes or slots through which first and second frame portions 14a and 14b may be coupled to other components of customizable saferoom 10. For example, first frame portion 14a may include preformed holes or slots through which anchor bolts 16 or other fasteners may be used to secure customizable saferoom 10 to foundation 18. For the further assembly of customizable saferoom 10, first frame portion 14a may also include preformed holes or slots through which fasteners 20 may be used to couple any adjacent sidewall panels 12b, endwall panels 12c, or floor panels (not shown) to first frame portion 14a. Similarly, second frame portion 14b may include preformed holes or slots through which fasteners 22 may be used to couple any adjacent sidewall panels 12b, endwall panels 12c, or ceiling panels 12a to second frame portion 14b.

[0017] In the illustrated embodiment, customizable saferoom 10 is configured for installation beneath a stairwell 24. As discussed above, it is generally recognized that the area beneath a stairwell is one of the more structurally sound areas within a structure. However, such areas often include a closet that is used for storage or, even worse, is inaccessible wasted space. Customizable saferoom 10, however, is configured to be placed beneath stairwell 24 in a pre-existing closet or other adaptable and irregular space. For adaptation to the irregular space beneath stairwell 24, the illustrated customizable safe room 10 includes at least one ceiling panel 12a that includes a sloped portion 26 at an end 28 furthest from an ingress point 30 to customizable saferoom 10. Thus, end 28 of customizable saferoom 10 is configured for placement beneath one or more steps of stairwell 24 that are closer to the foundation 18 on which customizable saferoom 10 is installed. In the illustrated embodiment, ceiling panel 12a of customizable saferoom 10 also includes a flat portion 32 that is substantially parallel to foundation 18 beneath customizable saferoom 10. In particular embodiments, the area beneath flat portion 32 may provide the greatest height dimension within customizable saferoom 10.

[0018] In particular embodiments, customizable saferoom 10 may include a ventilation system 34 providing for the circulation of air to and from customizable saferoom 10. For example, ventilation system 34 may include vents in one or more of the panels 12 of customizable saferoom 10. Additionally or alternatively, ventilation system 34 may include a fan or other mechanical device for removing stale air and adding fresh air to customizable saferoom 10. In particular embodiments, ventilation system 34 may be debris resistant to prevent the passage of storm-carried debris into customizable saferoom 10.

[0019] Although customizable saferoom 10 is described as being configured for placement beneath a stairwell 24, it is recognized that the particular configuration of the panels 12 forming customizable saferoom 10, as illustrated in FIG. 1, is merely one example configuration. Customizable saferoom 10 may be of any desired configuration and is said to be “customizable” since the saferoom 10 may be customized depending upon the size and shape of the space in which customizable saferoom 10 is installed. For example, where customizable saferoom 10 is designed to be placed within an L-shaped closet, customizable saferoom 10 may likewise have an L-shaped configuration. As another example, where customizable saferoom 10 is designed to be placed beneath a set of stairs 24, as shown in FIG. 1, the ceiling panel of customizable saferoom may also be stair-stepped to mate with the underside of the stairs. As another example still, it is generally recognized that ingress 30 to customizable saferoom 10, though shown on an endwall 12c, may likewise be included on a sidewall 12b where appropriate. Alternatively, it may be desirable to incorporate ingress 30 into ceiling panel 12a. Thus, ingress 30 may form a hatch that is accessible from the top floor of stairwell 24 or from a landing of stairwell 24.

[0020] Furthermore, although described as being customizable configured for placement within a pre-existing space, it is recognized that the customizable saferoom 10 of in FIG. 1 may also be easily incorporated into a residence or other
building during construction. The shape may vary depending upon the design of the building. As another possible modification, the panels 12 forming customizable saferoom 10 may be sealed or otherwise treated with a protective coating. In particular embodiments, for example, panels 12 may include an epoxy coating that is resistant to rust or other corrosion. Such a protective coating may be desirable where it is anticipated that exterior surfaces of customizable saferoom 10 may come into contact with water, minerals, and other damaging elements. Alternatively, a protective coating may be desirable where a durable and finished look is desired.

[0021] FIGS. 2A-C illustrate schematic diagrams of various components for forming a customizable saferoom 10, according to an embodiment of the present invention. Although the components of FIGS. 2A-C may be described as being of particular shapes and dimensions, it is understood that such shapes and dimensions are provided as a mere example of a particular customizable saferoom 10. As described above, the dimensions of the components may vary, as required, to maximize the size of customizable saferoom 10 within the area in which customizable saferoom 10 is installed.

[0022] Specifically, FIG. 2A illustrates a base frame 100 that may be configured, as described above, for the anchoring of customizable saferoom 10 to foundation 18 or other supporting structure beneath customizable saferoom 10. As illustrated, base frame 100 comprises four L-shaped frame portions 102a-d that are coupled to one another to form a substantially rectangular area 104 within base frame 100. In a particular embodiment, each frame portion 102a-d may include an L-shaped angle formed of heavy gauge steel. Thus, each frame portion 102a-d may include two legs 106a and 106b that form a right angle. In particular embodiments, legs 106a and 106b may each have a length on the order of approximately 4 inches. Although shown rectangular, the size and shape of area 104 may vary depending upon the shape of the area in which saferoom 10 is to be placed.

[0023] A first leg 106a may be positioned such that it is substantially parallel and adjacent to foundation 18. For the anchoring of base frame 100 to foundation 18, first leg 106a includes preformed holes or slots 108 for receiving anchor bolts to attach base frame 100 to foundation 18. In particular embodiments, high strength ½ inch anchor bolts may be used to anchor base frame 100 to foundation 18. Accordingly, in particular embodiments, holes 108 may have a diameter on the order of approximately ½ inch. In another embodiments, high strength ¾ inch anchor bolts may be used to anchor base frame 100 to foundation 18. As a result, holes 108 may have a corresponding diameter on the order of approximately ¾ inch.

[0024] Second leg 106b of base frame 100 may be configured similar to first leg 106a. However, when installed, second leg 106b may be substantially perpendicular to foundation 18. Accordingly, second leg 106b may be used to couple base frame 100 to the panels 12 forming the walls of saferoom 10. For the coupling of second leg 106b to panels 12, second leg 106b may include preformed holes or slots 110 for receiving high-strength fasteners, such as high-strength fasteners 20 and 22 described above with respect to FIG. 1. Thus, in particular embodiments, second leg 106b may include preformed holes 110 that have a diameter on the order of approximately ½ inch for receiving ½ inch anchor bolts.

[0025] FIG. 2B illustrates one side of a top frame 200 that may be configured, as described above, for coupling the walls 12b and 12c of customizable saferoom 10 to ceiling panel 12a. As illustrated, top frame 200 comprises four or more L-shaped frame portions 202a-d that are coupled to one another to form two substantially planar areas 204a and 204b within top frame 200. Similar to base frame 100, it is generally recognized that the size and shape of planar areas 204a-b may vary depending upon the shape of the area in which saferoom 10 is to be placed. As discussed above, the illustrated shape may be particularly suited for the placement of customizable saferoom 10 in an irregular space such as beneath a stairwell.

[0026] In a particular embodiment, each frame portion 202a-d may include an L-shaped angle formed of heavy gauge steel. Thus, each frame portion 202a-d may include two legs 206a and 206b that form a right angle with one another. In particular embodiments, legs 206a and 206b may each have a length on the order of approximately 4 inches. A first leg 206a may be positioned such that it is substantially parallel to foundation 18. Thus, first leg 206a may couple to ceiling panel 12a and may include preformed holes or slots 208 for receiving high-strength fasteners for the coupling of first leg 206a to ceiling panel 12a. In particular embodiments, high strength ½ inch bolts may be used to couple top frame 200 to ceiling panel 12a. Accordingly, in particular embodiments, holes 208 may have a diameter on the order of approximately ½ inch. In another embodiments, high strength ¾ inch bolts may be used to couple top frame 200 to ceiling panel 12a. As a result, holes 208 may have a corresponding diameter on the order of approximately ¾ inch.

[0027] Second leg 206b of top frame 200 may be configured similar to first leg 206a. However, when installed, second leg 206b may be substantially perpendicular to foundation 18 and ceiling panel 12a and substantially parallel to the wall panels 12b-c. Accordingly, second leg 206b may be used to couple top frame 200 to the panels 12b-c forming the walls of customizable saferoom 10. To enable such couplings, second leg 206b may include preformed holes or slots 210 for receiving high-strength fasteners, such as high-strength fasteners 20 and 22 described above with respect to FIG. 1. Where fasteners 20 and 22 have a diameter on the order of approximately ½ inch, second leg 206b may include preformed holes 210 that have a diameter on the order of approximately ½ inch to accommodate fasteners 20 and 22.

[0028] As described above, top frame 200 forms two substantially planar areas 204a and 204b within top frame 200. When installed to form customizable saferoom 10, planar area 204a is substantially parallel to foundation 18a and couples to a flat portion 32 of ceiling panel 12a. By contrast, planar area 204b is sloped from planar area 204a toward foundation 18b and couples to a sloped portion 26 of ceiling panel 12a. Thus, the height of customizable saferoom 10 is greater beneath top frame portion 202d than beneath top frame portion 202c. The described embodiment may be appropriate for placing a customizable saferoom 10 that includes top frame 200 or a top frame similar to top frame 200.
frame 200 beneath a stairwell or other irregular surface within the house or other building. For example, planar area 204a of top frame 200 may be positioned in a stairwell beneath a lower portion of steps.

[0029] FIG. 2C illustrates a sidewall panel 300 according to a particular embodiment. Although a sidewall panel may be formed from a single piece of metal or other suitable material, the illustrated sidewall panel 300 is comprised of multiple sidewall portions 302. For example, in the illustrated embodiment, sidewall panel 300 is comprised of four sidewall portions 302a-d and each sidewall portion 302a-d is configured to be coupled to at least one adjacent sidewall portion 302a-d. Sidewall portions 302a-d may each be C-shaped, U-shaped, or of another appropriate configuration that allows for the coupling together of adjacent sidewall portions 302a-d. C-shaped and U-shaped panels may be particularly suitable for coupling to one another since such portions include legs 303a and 303b. Legs 303a-b of adjacent C-shaped or U-shaped panels may be positioned proximate to each other, and preformed holes or slots formed through the legs of C-shaped or U-shaped panels may be aligned. To couple adjacent sidewall portions 302a-d, fasteners such as bolts may be inserted through the aligned preformed holes or slots.

[0030] As illustrated, sidewall portions 302a and 302b are substantially rectangular and correspond generally with the tallest portion of customizable saferoom 10. In a particular embodiment, sidewall portions 302a and 302b comprise C-channel members that each have a width on the order of approximately 20%6 inches and a length on the order of 72 inches. Thus, if a customizable saferoom 10 is constructed using a sidewall panel 300, such as that illustrated in FIG. 2C, the tallest portion of sidewall panel 300 may be approximately 6 feet tall.

[0031] Sidewall portions 302a and 302b each include two preformed slots 304 along a top edge 306. In particular embodiments, top edge 306 of panel 300 is placed proximate the ceiling and ceiling frame of customizable saferoom 10. As illustrated, top edge 306 includes a substantially flat portion that is parallel to the opposing bottom edge 310, which is placed proximate the foundation 18 and base frame 14a of customizable saferoom 10. Similar to top edge 306, sidewall portions 302a and 302b each include two preformed slots 308 along a bottom edge 310. In particular embodiments, where sidewall portions 302a and 302b have a width of approximately 20%6 inches, preformed slots 304 and 308 may be positioned such that they are approximately 6 inches from the center line 312 and 314 of sidewall portions 302a and 302b, respectively.

[0032] In contrast to sidewall portions 302a and 302b, sidewall portion 302c includes a top edge 318 that includes a flat portion and a sloped portion. The sloped portion corresponds generally with the slope of the ceiling frame. Where customizable saferoom 10 is configured for installation beneath a stairwell and includes a ceiling having both a sloped portion and a flat portion, sidewall portion 302c may be used to form the portion of the sidewall 300 that is adjacent to and couples to the portion of the ceiling or top frame that transitions from a substantially flat portion to a substantially sloped portion. Thus, sidewall portion 302c is a transition portion of sidewall 300.

[0033] In a particular embodiment, sidewall portion 302c includes a C-channel member having a width on the order of approximately 20%6 inches. The longer edge of sidewall portion 302c has a length on the order of approximately 72 inches. The opposing edge may vary depending upon the width of the sidewall portion 302c and the slope of the ceiling frame. In one example embodiment, the length of the opposing edge may be on the order of approximately 60 inches. Like sidewall portions 302a and 302b, sidewall portion 302c includes two preformed slots 316 along a top edge 318 and two preformed slots 320 along a bottom edge 322. In particular embodiments, where sidewall portion 302c has a width of approximately 20%6 inches, preformed slots 316 and 320 may be positioned such that they are approximately 6 inches from the center line 316 of sidewall portion 302c.

[0034] Sidewall portion 302d comprises a sloped portion and, in the illustrated embodiment, is placed proximate to the shortest endwall 12c of customizable saferoom 10. Thus, the longer side of sidewall portion 302d couples to transition sidewall portion 302c, and the shorter side of sidewall portion 302d couples to and endwall panel 23c. The slope of the top edge 326 of sidewall portion 302d corresponds generally with the slope of the ceiling frame and the slope of the stairwell or other irregular surface under which the customizable saferoom is placed. Accordingly, sidewall portion 302d may be used to form a portion of sidewall 300 that is adjacent to and couples to the portion of the ceiling or top frame that is sloped relative to the supporting foundation.

[0035] Similar to sidewall portions 302a-c, sidewall portion 302d may include a C-channel member having a width on the order of approximately 20%6 inches in particular embodiments. For coupling to sidewall portion 302d, the longest side of sidewall portion 302d may have a length on the order of approximately 60 inches, and the shortest side may have a length on the order of approximately 45 inches. Like sidewall portions 302a-c, sidewall portion 302d includes two preformed slots 324 along a top edge 326 and two preformed slots 328 along a bottom edge 330. In particular embodiments where sidewall portion 302d has a width of approximately 20%6 inches, preformed slots 324 and 328 may be positioned such that they are approximately 6 inches from the center line 332 of sidewall portion 302d.

[0036] The dimensions described above are appropriate for the construction of a customized saferoom has a length of approximately 81 inches, as measured from endwall to endwall. The dimensions provided, however, are merely one example embodiment. As stated above, dimensions may vary based on the size of the area housing the customizable saferoom 10. Similarly, the number of portions forming a panel, such as sidewall 300, may also vary based on the desired dimensions of the customizable saferoom 10. Thus, it is recognized that a sidewall may have fewer or more panel portions than the illustrated four; and the top edge of each panel portion may be configured as necessary for the space provided. Furthermore, although FIG. 2C illustrates a sidewall, specifically, it is recognized that an endwall of customizable saferoom 10 may be constructed to have features similar to those described above with respect to sidewall panel 300.

[0037] As a further modification, although sidewall 300 is not illustrated as including an ingress, the panel portions may be modified to accommodate a side ingress. FIG. 3A
illustrates an example configuration of a customizable saferoom 400 having a side ingress 402 in a first sidewall 404. Sidewall 404 is formed from two U-shaped portions 406 and 408 and an L-shaped portion 410. Adjacent legs of the sidewall portions 406, 408, and 410 are coupled by fasteners 412 that extend through aligned preformed holes in each adjacent leg similar to that described above with regard to FIG. 2C. A gap in first sidewall 404 corresponds with the placement of an ingress 402, which may accommodate a door similar to that which will be described below with regard to FIG. 4. Additional preformed holes or slots may be disposed proximate a top edge of each of sidewall portions 406, 408, 410 for coupling sidewall portions 406, 408, and 410 to the ceiling or top frame. Conversely, preformed holes or slots disposed proximate a bottom edge of the sidewall portions 406, 408, and 410 may be used to couple sidewall portions 406, 408, and 410 to the base frame.

[0038] A second sidewall 414 is formed similar to first sidewall 404 but does not include a gap for an ingress. Specifically, in the illustrated embodiment, second sidewall 414 is formed from four U-shaped portions 416, 418, 420, and 424. Adjacent legs of the U-shaped portions 416, 418, 420, and 424 are coupled by fasteners 426 that extend through aligned preformed holes in each adjacent leg. Additional preformed holes or slots may be disposed proximate a top edge of each of sidewall portions 416, 418, 420, and 424 for coupling sidewall portions 416, 418, 420, and 424 to the ceiling or top frame. Similarly, preformed holes or slots disposed proximate a bottom edge of the sidewall portions 416, 418, 420, and 424 may be used to couple sidewall portions 416, 418, 420, and 424 to the base frame.

[0039] First sidewall 404 and second sidewall 414 each couple to a first endwall 428 and a second endwall 430. In the illustrated embodiment, first and second endwall 428 and 430 are configured similarly. Thus, only first endwall 428 will be described in detail. In the illustrated embodiment, first endwall 428 is formed from two L-shaped portions 432 and 434. The shorter legs of the L-shaped portions are coupled to one another by one or more fasteners 436 that extend through aligned preformed holes formed in the shorter legs of the L-shaped portions. Similarly, the longer legs of L-shaped portions 432 and 434 are coupled to first and second sidewalls 404 and 414, respectively. Specifically, a first endwall portion 432 is coupled to a first sidewall portion 406 of first sidewall 404 by one or more fasteners 438. A second endwall portion 434 is coupled to a first sidewall portion 416 of second sidewall 414 by one or more fasteners 440. Additional preformed holes or slots may be disposed proximate a top edge of first and second endwall portions 432 and 434 for coupling first and second endwall portions 432 and 434 to the ceiling or top frame. Similarly, preformed holes or slots disposed proximate a bottom edge of the L-shaped portions 432 and 434 may be used to couple first and second endwall portions 432 and 434 to the base frame.

[0040] FIG. 3B illustrates an example of an alternative configuration of a customizable saferoom 500 having a side ingress 502 in first endwall 504. In the illustrated embodiment, first endwall 504 is actually formed from the leg portions of sidewall panels. Thus, construction of first endwall 504 does not require any independently constructed panel portions. Again, the illustrated embodiment is merely one example configuration of a customizable saferoom 500. It is recognized that many modifications to the illustrated configuration are possible. For example, end ingress 502 may be centered on first endwall 504, in particular embodiments. As another example, first endwall 504 may be formed from straight panels, C-shaped panels, U-shaped panels, L-shaped panels, or any combination thereof.

[0041] A second endwall 506 is formed similar to first and second endwalls 428 and 430 of FIG. 3A. Thus, endwall 506 is formed from two L-shaped endwall portions 508 and 510. The shorter legs of each of the L-shaped portions 508 and 510 are coupled to one another by one or more fasteners 512 that extend through aligned preformed holes formed in the shorter legs of the L-shaped portions. Similarly, the longer legs of first endwall portion 508 and second endwall portion 510 are coupled to a first sidewall 512 and second sidewall 514, respectively. Specifically, first endwall portion 508 is coupled to first sidewall 512 by one or more fasteners 516. Similarly, second endwall portion 510 is coupled to second sidewall 514 of by one or more fasteners 518.

[0042] Each of sidewalls 512 and 514 may be formed similar to second sidewall 414 of FIG. 3A and will not be described in detail here. However, unlike sidewall 414, sidewall 512 may include a longer leg of the U-shaped sidewall panel portion 520 that is proximate to first endwall 504. In the illustrated embodiment, the longer leg of the U-shaped sidewall portion 520 may form a corner of the configurable saferoom 500. As a result, U-shaped sidewall portion 520 may form both a portion of sidewall 514 and a portion of first endwall 504. Specifically, the longer leg of the U-shaped sidewall portion 514 may form a portion of first endwall 504 that includes ingress 502.

[0043] FIG. 4 is a schematic diagram illustrating an interior view of a secure ingress 500 within a customizable saferoom, according to an embodiment of the present invention. As described above, ingress 500 may be formed in an endwall or sidewall of the saferoom. Additionally, it is recognized that where design considerations make it preferable, ingress 500 may be formed in a ceiling panel of the customizable saferoom.

[0044] Ingress 500 includes a door assembly 502 that is coupled to adjacent panels s of the saferoom using heavy gauge hinges. As shown, door assembly 502 includes a double-door assembly. However, it is recognized that a single door assembly, an accordion style door assembly, or any other suitable door assembly may be used in alternative embodiments. Depending upon the particular embodiment desired and the space in which the saferoom is installed, double-door assembly 502 may open toward the interior of the customizable saferoom or toward the exterior of the customizable saferoom. A door assembly that opens toward the interior of the customizable saferoom offers some benefits. For example, because such a door may be opened from the inside, any debris outside the doors of the saferoom will not prevent the opening of the doors. Additionally, such a configuration allows the inhabitants of the customizable saferoom to easily push the doors shut from the interior of the saferoom.

[0045] In the illustrated embodiment, a first door 504a forming double-door assembly 502 includes a lip portion 506 that is configured to create an overlap with an adjacent second door 504b when the door assembly is in the closed position. As a result, debris may be prevented from entering
the customizable saferoom through a crack between first door 504a and second door 504b. For further sealing door assembly 502, door assembly 502 includes at least one locking mechanism. In the illustrated embodiment, door assembly 502 includes three locking mechanisms that each comprise a bar 508 and cradle assembly 510. For example, as illustrated, two cradle portions 510 are mounted or otherwise coupled to the adjacent wall panel of the customizable saferoom. To seal the door assembly, bar 508 may be positioned proximate the interior side of first and second doors 504a-b and the respective ends of bar 508 may be slid into the two opposing cradle portions 510. When in place, bar 508 prevents first and second doors 504a-b from being opened from the outside.

Although FIG. 4 illustrates a locking mechanism that includes a bar and cradle assembly, it is recognized that any mechanism suitable for securing the door(s) of customizable saferoom may be utilized. For example, in particular embodiments, deadbolts may be used. The deadbolts may be in addition to or in lieu of the bar and cradle assembly locking mechanisms illustrated in FIG. 4. The deadbolts may be lockable from the inside, outside, or both. When locked from the outside, the customizable saferoom may be secured when not in use. The space may be used as storage and because lockable may be used to store valuable items, in particular embodiments. When locked from the inside, the deadbolt may be used by inhabitants of the customizable saferoom to secure the doors to prevent access by anyone outside the customizable saferoom. Such embodiments may be desirable when customizable saferoom is to be used as a panic room in addition to or in lieu of its use as a weather shelter. As a further modification, it is recognized that although three locking mechanisms are depicted in the illustrated embodiment, door assembly 502 may include any appropriate number and combination of locking mechanisms.

Although the present invention has been described with several embodiments, numerous changes, substitutions, variations, alterations, transformations, and modifications may be suggested to one skilled in the art, and it is intended that the present invention encompass all such changes, substitutions, variations, alterations, transformations, and modifications as fall within the spirit and scope of the appended claims. For example, although the above described embodiments include each sidewall and endwall being comprised of multiple panels, it is recognized that each sidewall and endwall may be comprised of a single panel. As another example, although the above described embodiments include a base frame and a top frame for coupling the components of the customizable saferoom, it is recognized that the various panels may be directly coupled to one another and the base and top frames may be omitted from the components forming the customizable saferoom.

What is claimed is:

1. A customizable saferoom comprising:
   a ceiling panel;
   a first wall panel having a first set of dimensions;
   a second wall panel having a second set of dimensions;
   a third wall panel having a third set of dimensions;
   a fourth wall panel having a fourth set of dimensions; and
   wherein each of the ceiling panel and the first, second, third, and fourth wall panels are coupled to at least one other of the ceiling panel and the first, second, third, and fourth wall panels to form an enclosed structure, the first, second, third, and fourth sets of dimensions are selected to optimize the volumetric capacity of the enclosed structure within the confines of a pre-existing space within a building.

2. The customizable saferoom of claim 1, wherein:
   at least one of the first, second, third, and fourth wall panels has a height that is less than a height of at least one other of the first, second, third, and fourth wall panels; and
   at least a portion of the ceiling panel is sloped relative to a foundation upon which the customizable saferoom is assembled.

3. The customizable saferoom of claim 2, wherein the portion of the ceiling panel that is sloped is configured for placement beneath a stairwell.

4. The customizable saferoom of claim 1, wherein each of the first, second, third, and fourth wall panels comprise a plurality of panel portions, each panel portion coupled to at least one other adjacent panel portion.

5. The customizable saferoom of claim 4, wherein the plurality of panel portions are selected from the group consisting of U-channels, C-channels, and angles.

6. The customizable saferoom of claim 1, wherein at least one of the first, second, third, and fourth wall panels comprise an ingress through which the enclosed structure may be entered and exited.

7. The customizable saferoom of claim 6, wherein the ingress comprises a door assembly.

8. The customizable saferoom of claim 7, wherein the door assembly is configured to open into the interior of the enclosed structure.

9. The customizable saferoom of claim 7, wherein the door assembly comprises a locking mechanism allowing the door assembly to be locked from the interior of the enclosed structure.

10. The customizable saferoom of claim 7, wherein the door assembly comprises at least one bar and cradle locking mechanism allowing the door assembly to be locked from the interior of the enclosed structure.

11. The customizable saferoom of claim 7, wherein the door assembly comprises a locking mechanism allowing the door assembly to be locked from the exterior of the enclosed structure.

12. The customizable saferoom of claim 1, wherein the ceiling panel comprises a ventilation system operable to allow air to circulate to and from the enclosed structure.

13. A customizable saferoom adaptable for an irregular space, comprising:
   a first sidewall comprising a first portion and a second portion, the first portion of the first sidewall having a height that is greater than a height of the second portion of the first sidewall;
   a second sidewall comprising a first portion and a second portion, the first portion of the second sidewall having a height that is greater than a height of the second portion of the second sidewall panel;
a first endwall and a second endwall, the first endwall having a height that is greater than a height of the second endwall;
a ceiling panel comprising a substantially flat portion and substantially sloped portion; and
wherein each of the first and second sidewalls, first and second endwalls, and ceiling panel are configured to be coupled to at least another of the first and second sidewalls, first and second endwalls, and ceiling panel to form an enclosed structure.

14. The customizable saferoom of claim 13, wherein the portion of the ceiling panel that is sloped is configured for placement beneath a stairwell.

15. The customizable saferoom of claim 13, wherein at least one of the ceiling, first sidewall, second sidewall, first endwall, and second endwall comprises an entrance through which the enclosed structure may be entered and exited.

16. The customizable saferoom of claim 13, wherein the entrance comprises a door assembly configured to open into the interior of the enclosed structure.

17. The customizable saferoom of claim 16, wherein the door assembly comprises a locking mechanism allowing the door assembly to be locked from the interior of the enclosed structure.

18. The customizable saferoom of claim 16, wherein the door assembly comprises a locking mechanism allowing the door assembly to be locked from the exterior of the enclosed structure.

19. The customizable saferoom of claim 13, wherein the ceiling panel comprises a ventilation system operable to allow air to circulate to and from the enclosed structure.

20. The customizable saferoom of claim 13, further comprising a ceiling frame configured to couple the ceiling panel to each of the first and second sidewall panels and the first and second endwall panels to form the enclosed structure.

21. The customizable saferoom of claim 13, further comprising a base frame configured to couple to each of the first and second sidewall panels and the first and second endwall panels, the base frame further configured to anchor the enclosed structure to a foundation.

22. A method for assembling a customizable saferoom upon a foundation, comprising:
coupling a first sidewall to a ceiling panel;
coupling a second sidewall to the ceiling panel;
coupling a first endwall to the first and second sidewalls; and
coupling a second endwall to the first and second sidewalls and the ceiling panel; and
wherein when coupled at least one of the first sidewall, the second sidewall, the first endwall, and the second endwall have a height that is less than a height of at least one other of the first sidewall, the second sidewall, the first endwall, and the second endwall such that at least a portion of the ceiling panel is substantially non-parallel to a foundation upon which the customizable saferoom is assembled.

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