PERIMETER WALL SUPPORT SYSTEM FOR A MANUFACTURED HOME

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ABSTRACT

A perimeter wall support system is disclosed for supporting a perimeter wall section of a manufactured home. The perimeter support system comprises an auxiliary support pier assembly disposed adjacent a perimeter wall having an auxiliary pier support pad with a support pier supported thereon, and at least one elongated strut extending between the auxiliary support pad and the perimeter wall section. At least one anchor coupling affixes a lower end of the strut to the auxiliary support pad. A connector member is carried by an upper end of the strut for securing the strut to the wall section. A longitudinally adjustable mechanism is operable for adjusting the effective length of the strut between the floor structure and the auxiliary support pad in finite increments.
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BACKGROUND OF THE INVENTION

[0001] This invention is directed to a perimeter wall support system for providing additional support to a perimeter wall section of a manufactured home in which an architectural or structural feature such as a sliding door, a bay window, picture window, and the like, is installed.

[0002] Heretofore, numerous foundation anchoring and stabilization systems have been proposed for anchoring and stabilizing manufactured homes and the like. Typically, the manufactured home has a chassis which is formed from a plurality of laterally spaced longitudinal I-beams. The manufactured home is generally supported by a plurality of axes positioned approximately in the center of the manufactured home to permit transporting the home. The manufactured home is installed or set up in a permanent location by providing block supports, jacks, or other pier foundations around the periphery and center of manufactured homes.

[0003] In known prior art installation systems, for example, the supports are formed of concrete blocks, or other similar support structures, that rely on the compression force of the manufactured home to hold the home in place on concrete pads or other suitable foundation pads. Longitudinal and/or lateral braces may then be installed between the foundation pad and chassis of the home.

[0004] Manufactured homes are being manufactured and remodeled with more and more architectural features and other improvements, such as sliding glass doors for entrance onto a deck, bay windows, and other structural and/or architectural features which may need additional support at the perimeter walls of the home. Typically, foundation footings which are placed directly underneath a perimeter wall of the manufactured home must be below the local frost line in order to prevent the heave of frost under the pier. This requires digging down to the frost line, which varies with the location, and filling with concrete to provide a footing.

[0005] In order to avoid this extensive and expensive foundation work at the perimeter wall of the manufactured home, the need for a generally frost free foundation for the perimeter support of a manufactured home is a significant problem in the manufactured home industry, particularly for providing auxiliary support to a perimeter wall section.

[0006] Accordingly, an object of the present invention is to provide an auxiliary support system for a perimeter wall section of a manufactured home.

[0007] Another object of the present invention is to provide an auxiliary support system to support different types of architectural and structural features built in perimeter walls of manufactured homes.

[0008] Still another object of the present invention is to provide an adjustable support system for a perimeter wall of a manufactured home that can meet any applications.

SUMMARY OF THE INVENTION

[0009] The above objectives are accomplished according to the present invention by providing a perimeter wall support system for supporting a perimeter wall section of a manufactured home that contains auxiliary wall structure such as one of a sliding glass door, picture window, bay window, and the like. The system includes an auxiliary support pier assembly inset from the perimeter wall section, including an auxiliary support pad for supporting an auxiliary support pier wherein a top of the support pier supports a portion of the manufactured home. Advantageously, a pair of elongated struts extend outwardly and upwardly from the auxiliary support pad to the perimeter wall section to be supported. An anchor coupling is operable for fixing a lower end of the struts to the auxiliary support pad including a first part affixed to the strut and a second part affixed to the auxiliary support pad. Preferably, an incremental longitudinal adjustment mechanism is included in the anchor coupling being operable to incrementally adjust the effective length of the strut between the support pad and a connector member carried by an upper end of the strut for connecting the strut to the perimeter wall section. Preferably, the second part is pivotally connected to the first part so that the inclination of the strut may be adjusted and the longitudinal adjustment mechanism is included in the coupling. The manufactured home includes a floor structure supporting the wall section, including a plurality of floor joists running transverse to the longitudinal axis of the manufactured home, and a floor plate running transverse to the floor joists in the wall section being supported. The upper end of strut is preferably affixed to the floor structure by the connector member. The connector member includes an angle tab intersecting the strut wherein the tab is adapted for connection to the floor structure. The connector member tab preferably includes a pair of flush legs formed by a flattened end section of the strut, and a flexible joint formed between the tab and the strut being operable to provide a degree of rotation of the strut relative to the tab so that the inclination may be changed for proper alignment and connection of the tab and strut to the support structure. Advantageously, the second part of the anchor coupling may be operable to rotate in a horizontal plane on the pad to adjust the yaw position of the strut.

[0010] In accordance with a method of the invention a perimeter wall support system is provided for additional support to a wall section of a manufactured home containing additional wall structure or architectural feature, wherein the manufactured home is supported by a foundation system having a plurality of vertical foundation piers disposed at predetermined locations relative to a longitudinal axis of the home, each foundation pier having a ground base, and at least one elongated brace connected between the manufactured home and the ground base of the pier. A method of reinforcing and supporting the perimeter wall section is provided which includes placing an auxiliary vertical support pier at a location adjacent the perimeter wall section with a base of the pier supported on the ground. Next, at least one longitudinal adjustable strut extends upwardly and outwardly from the base to the perimeter wall section.

[0011] The method includes adjusting the effective length of the strut incrementally using an incremental adjustment mechanism carried by the strut, adjusting the strut length incrementally to a desired location to support the wall section, and attaching an upper end of the strut to the wall section.

DESCRIPTION OF THE DRAWINGS

[0012] The construction designed to carry out the invention will hereinafter be described, together with other features thereof.

[0013] The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings forming a part thereof, wherein an example of the invention is shown and wherein:
FIG. 1 is a rear perspective view of a manufactured home with a sliding glass door assembly installed in the perimeter wall with auxiliary support provided by a perimeter wall support system according to the invention;

FIG. 2 is a perspective view of a perimeter wall support system according to the invention;

FIG. 3 is a perspective view of another embodiment of perimeter wall support system according to the invention;

FIG. 4 is a side elevation of a perimeter wall support system according to the invention;

FIG. 5A is a side elevation of an upper connector member for affixing a support strut of a perimeter wall support system to the structure of a perimeter wall of a manufactured home according to the invention;

FIG. 5B is an end view of a connector member tab according to the invention;

FIG. 6 is an elevation of an anchor coupling for attaching a lower end of a support strut of a perimeter wall support system to an auxiliary support plate of a manufactured home foundation system according to the invention;

FIGS. 7A-7E are schematic diagrams of a bending apparatus.

DESCRIPTION OF A PREFERRED EMBODIMENT

The invention relates to supporting a perimeter wall section of a manufactured home.

As can best be seen in FIG. 2, a conventional foundation stabilization system is illustrated generally at 10 for stabilizing and anchoring a manufactured home and the like portable building, which includes a foundation footing 11 to which a plurality of brace struts 12, 14, and 16 may be attached. Struts 12 and 14 are typically attached to an I-beam 18 of the pre-manufactured home chassis to brace and stabilize the home or building, in a first, longitudinal direction. Strut 16 is typically attached to a parallel I-beam 18 for bracing in a second, lateral direction. In the illustration embodiment, a pier 20 is supported on foundation footing 10 which may be provided by stacked concrete blocks 22, or other suitable pier construction, such as mechanical jacks, towers, etc.

Referring now to FIGS. 1 through 4, the invention will be described in more detail.

FIG. 1 illustrates a typical manufactured home 21 supported on conventional pier foundations 10, as described above. The manufactured home includes a sliding glass door assembly 40 built into the perimeter wall 23 of the mobile home requiring additional support to prevent sagging over the years. The glass doors may open onto a deck 25.

According to the invention a perimeter wall support system, designated generally as A, is shown for additional support of structural or architectural features built into the perimeter wall of a manufactured home such as sliding glass doors, picture windows, bay windows, and the like.

Referring now to FIG. 2, perimeter wall support A is illustrated as including at least one auxiliary support pier 26, typically made of concrete blocks 22, is supported on an auxiliary steel pier pad 24. I-beam 18 may rest atop support pier 26 as well as conventional foundation piers 10. Basically, the mobile home includes a plurality of floor joists 28 supported on the I-beams, and plywood sheathing 30 fixed to the floor joists. Runners 32 may extend between the floor joists. While other structural elements are also included in the construction of a manufactured home, only those structural elements basically needed to illustrate the invention and understand the invention are shown. In the illustrated embodiment a sliding glass door assembly 40 is illustrated having a pair of sliding glass doors 40a and 40b, the assembly is illustrated as supported on a floor plate 42.

A pair of perimeter wall support struts 44 and 46 are illustrated extending from pier pad 24 to suitably supporting structure of the sliding glass door assembly 40. At the lower strut end, an anchor coupling, shown generally at 48, anchors the lower end of struts 44 and 46 to the auxiliary support pad. The upper end of the struts is affixed to associated support structure of the perimeter wall, for example, a pair of floor joists 28, flooring 30, or floor plate 42, by a connector member 50, as shown, etc.

Preferably, the struts 44, 46 are formed from rectangular tubes, although cylindrical tubes may be used as well. Connector members 50 are formed by a flattening and bending process. A metallic indentation 52 is formed in the brace tube by the bending process rendering the connector operable to provide a flexible or bendable joint about which the inclination of the connector member and strut relative to the joist may be had. A connector opening 53 is provided for receiving a fastener 54 to secure the connector member to the joist. The strut, connector member, and bending process are fully disclosed in commonly owned, co-pending application Ser. No. 12/583,350 filed Aug. 19, 2009 incorporated by reference into this application.

The struts can be adjusted in their vertical inclination generally between 10 and 45 degrees. Typically the brace tube is on an angle of 30 degrees in an average position, but may be adjusted ±15 and ±20 degrees from the position.

Basically, each connector member includes a major leg 40 and a minor leg 42. Metallic indentation 52 is formed in the brace tube by the bending process. The major and minor legs 40, 42, and the metallic indentation 52, are formed by the bending processes so as to provide a flexible or bendable joint 65 about which the connector orientation of the strut relative to the footing may be had. FIG. 5B represents a cross-section and an end view of the connector member wherein the opposing side walls 64a, 64b of the strut collapse inwardly under the upper side walls 64c, 64d. The top and bottom of the brace tubes 50c, 50d arrange generally undistorted.

Typically the strut is at an angle (a1) of 30 degrees in an average position, but may be adjusted at angles (a2, a3) between ±15 and ±20 degrees (FIG. 5A). Major leg 40 extends significantly past minor leg 42. A flex line 65 is formed at a bend in minor leg 42 which forms the terminus of minor leg 42. The bend extends upward in a curved transition 67 which merges into the straight top wall 64c of the brace extending toward the I-beam. The metallic indentation 52 is somewhat deformed as it flexes.

According to a bending process, illustrated in FIGS. 7A-7E, the tube is first placed into a bending machine where the upper and lower triangular-shaped tools 70 are forced together with their apex is engaging side walls 64a, 64b of the brace tube forming V-shaped indentures 72 in the side walls 64a, 64b of the tube. Second, the upper and lower sides 64a, 64b are pressed together flat by an anvils 74. The tube is formed by a bend upwardly to a reference angle of approximately 50° which forms the major leg 40 and minor leg 42 and indentations 44. This is controlled by the amount of tube fed into the flat anvils 80. Bottom plate 82 extends further longitudinally than top plate 80 (FIG. 7E) causing the tube to bend when plate 80 is pressed down. A reference angle of about 30°
has been found to provide a sufficiently flexible joint that yields angles of inclination in the proper range. In this process, a flex point or line 54 is formed at the intersection of an upper curved transition 42a and minor leg 42. Minor leg 42 is approximately 1/5 inches, and major leg 40 is approximately 2/5 inches. It has been found in the application of the present invention, that tubular brace 30-34 mounted to perimeter wall support structure at a 30° inclination from the horizontal, can be flexed and adjusted between a 10° to 45° inclination. Of course, other bending processes known in the art may also be used to form the strut tube described above.

[0034] Each anchor coupling 48 includes a first part 56 affixed to the lower end of the strut, and a second part 58 affixed to the support pier, as can best be seen in FIG. 6. The first part has a pivot member 60 and provides a part of a incremental longitudinal adjustment, designated generally as 61, along with a threaded rod 62 and a threaded opening 63 in the pivot member 60. A pivot is provided between pivot member 60 and a mounting member 66 by means of a pivot pin 68. Mounting member 66 affixed to pier plate 24 or can be operable to swivel horizontally on pier pad 24 by means of a bolt 69 threaded into the plate. The bolt can be loosened to swivel the mounting member to a desired position to align struts 44, 46 and connector member 50 to associated wall structure such as joists 28. A washer is located between mounting member and pier pad 24. The incremental adjustment provides for accurate placement of the mounting plate 70 underneath the floor plate of the sliding glass door assembly. By threading the rod in or out of the threads of the second part, a square fit of the mounting plate may be had against the joist.

[0035] As can best be seen in FIG. 2, an embodiment is illustrated wherein two struts supporting the perimeter wall are carried by one auxiliary support pier including a pivot pad 24 and a pier 26. The struts extend upwardly from the anchor couplings 48. In this application, the strut bars diverge laterally and upwardly to connect with the joist. First the connector member is fastened to the joist and the flexible joint is adjusted to a proper angle to connect to the coupling joint. In this case, a swivel coupling joint may also be utilized so the coupling joint may be swiveled to line the strut up between the connector member and the coupling anchor.

[0036] In FIG. 3, another embodiment of the invention is illustrated where two auxiliary support piers are utilized for reinforcing the support of a sliding glass door assembly. In this case, the struts extend upwardly and outwardly from an anchor coupling located in the middle of the support pier. Typically the auxiliary support pier will be located so it is a straight line between the anchor coupling and the joist to which connector member 56 is joined. Of course, it is to be understood that any number of auxiliary support piers can be used in any orientation or combination depending upon the application being made.

[0037] FIG. 4 represents either the use of a single strut, or the use of two struts as shown in FIGS. 3 and 4. In use, either connector member 50 or first part 56 is connected to floor joist 28 or second part respectively, first. Between the swivel action of second part 58 and the longitudinal adjustment of struts 44 or 46, connector member 56 may be adjusted to be substantially flush with the supported surface of the perimeter wall, e.g., joists 28 or floor plate 42.

[0038] While a preferred embodiment of the invention has been described using specific terms, such description is for illustrative purposes only, and it is to be understood that changes and variations may be made without departing from the spirit or scope of the following claims.

What is claimed is:

1. A perimeter wall support system for providing additional support to a perimeter wall section of a manufactured home needing auxiliary support wherein the manufactured home is supported by a foundation system having a plurality of vertical foundation pier assemblies disposed at predetermined locations relative to a longitudinal axis of the home supporting an I-beam of the manufactured home, each foundation pier assembly having a ground footing, and at least one elongated brace connected between the manufactured home and the ground footing of the pier, wherein the perimeter support system comprises:

- an auxiliary support pier assembly disposed adjacent a perimeter wall of the manufactured home for additional support;
- the auxiliary support pier assembly having an auxiliary pier support pad with a support pier supported thereon;
- at least one elongated strut extending between the auxiliary support pad and a perimeter wall section of the manufactured home to be supported;
- at least one anchor coupling for affixing a lower end of the strut to the auxiliary support pad;
- the anchor coupling including a first part affixed to the strut, and a second part affixed to the auxiliary support pad being coupled with the first part;
- a connector member carried by an upper end of the strut for securing the strut to support the perimeter wall section;
- a longitudinally adjustable mechanism being operable for adjusting the effective length of the strut between the floor structure and the auxiliary support pad in finite increments;
- whereby the auxiliary support pier provides additional support for the wall section containing an architectural feature or other heavy wall structure.

2. The system of claim 1 wherein the second part is pivotally connected to the first part so that the inclination of the strut may be adjusted.

3. The system of claim 2, wherein the longitudinal adjustment mechanism is included in the coupling.

4. The system of claim 3 wherein the adjustment mechanism includes a threaded rod carried by the strut threadably mated with a threaded opening formed in the second part for relative rotation.

5. The system of claim 4 wherein the manufactured home includes a floor structure supporting the wall section, including a plurality of floor joists running transverse to the longitudinal axis of the manufactured home, flooring, and a floor plate running transverse to the floor joists in the wall section being supported, wherein the perimeter wall support system includes the upper end of strut being affixed to at least one of the floor structure by the connector member.

6. The system of claim 5 wherein the connector member includes an angle tab intersecting the strut wherein the tab is adapted for connection to the floor structure.

7. The system of claim 6 wherein the connector member tab includes a pair of flash legs formed by a flattened end section of the strut, and a flexible joint formed between the tab and the strut being operable to provide a degree of rotation of the strut relative to the tab so that the inclination may be changed for proper alignment and connection of the tab and strut to the support structure.
8. The system of claim 7 wherein the pair of legs includes a major leg and a minor leg having a shorter length than the major leg, the major and minor legs being flattened to form the tab whereby the tab may be attached to the floor structure, and the angle of inclination may be changed to provide for proper alignment and attachment to the anchor coupling on the pad.

9. The system of claim 2 wherein the second part of the anchor coupling is operable to rotate in a horizontal plane on the pad to adjust the position of the strut.

10. The system of claim 1 wherein the manufactured home includes a floor structure including a plurality of floor joists running transverse to the longitudinal axis of the manufactured home and a floor plate transversely spanning the floor joists in the wall section being supported, and wherein the perimeter wall support system includes the upper end of strut being affixed to the floor structure by the connector member.

11. The system of claim 10 wherein the connector member includes an angle bar having first and second intersecting legs wherein the first leg is for connecting to the strut and the second leg is for connection to the floor structure.

12. The system of claim 1 wherein the auxiliary support pier assembly is inset from said perimeter wall section underneatn the mobile home, and includes a pair of struts connected between the inset auxiliary support pad and the perimeter wall section wherein a first strut extends from the support plate upwardly and outwardly to a first location of the wall section, a second strut extends from the support pad upwardly and outwardly to a second location of the wall section, and the first and second struts diverging from the support pad to the wall section.

13. The system of claim 1 including a first and second auxiliary support pier assemblies, each support assembly having at least one strut extending from the auxiliary support pad to the supported wall section.

14. A perimeter wall support system for supporting a wall section of a manufactured home wherein the wall section contains auxiliary wall structure such as one of a sliding glass door, picture window, bay window, and the like, comprising:

   an auxiliary support pier assembly inset from the perimeter wall section including an auxiliary support pad for supporting an auxiliary support pier wherein a top of the support pier supports a portion of the manufactured home;
   a pair of elongated struts being operable to extend outwardly and upwardly from the auxiliary support pad to the perimeter wall section to be supported;
   an anchor coupling being operable for fixing a lower end of the struts to the auxiliary support plate including a first part affixed to the strut and a second part affixed to the auxiliary support pad;
   an incremental longitudinal adjustment mechanism included in the anchor coupling being operable to incrementally adjust the effective length of the strut between the support pad and a connector member carried by an upper end of the strut for connecting the strut to the perimeter wall section.

15. The system of claim 14 wherein the second part is pivotally connected to the first part so that the inclination of the strut may be adjusted.

16. The system of claim 15 wherein the longitudinal adjustment mechanism is included in the coupling.

17. The system of claim 14 wherein the manufactured home includes a floor structure supporting the wall section, including a plurality of floor joists running transverse to the longitudinal axis of the manufactured home, flooring, and a floor plate running transverse to the floor joists in the wall section being supported, wherein the perimeter wall support system includes the upper end of strut being affixed to at least one of the floor structure by the connector member.

18. The system of claim 17 wherein the connector member includes an angle bar intersecting the strut wherein the tab is adapted for connection to the floor structure.

19. The system of claim 18 wherein the connector member tab includes a pair of flush legs formed by a flattened end section of the strut, and a flexible joint formed between the tab and the strut being operable to provide a degree of rotation of the strut relative to the tab so that the inclination may be changed for proper alignment and connection of the tab and strut to the support structure.

20. The system of claim 18 wherein the second part of the anchor coupling is operable to rotate in a horizontal plane on the pad to adjust the position of the strut.

21. A perimeter wall support system for providing additional support to a wall section of a manufactured home containing additional wall structure or architectural feature, wherein the manufactured home is supported by a foundation system having a plurality of vertical foundation piers disposed at predetermined locations relative to a longitudinal axis of the home, each foundation pier having a ground base, and at least one elongated brace connected between the manufactured home and the ground base of the pier:

   placing a vertical support pier at a location inward of the perimeter wall section with a base of the pier supported on the ground;
   placing at least one longitudinal adjustment strip between the base providing at least one strip extending upwardly and outwardly from the base to the perimeter wall section;
   adjusting the length of the strap incrementally using an incremental adjustment mechanism carried by the strap;
   adjusting the strap incrementally to a desired location on the wall section; and
   attaching an upper end of the strap to the wall section.

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