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RAMP-to-RAMP-LEVELER CONVERSION KIT FOR DROP-DECK TRAILERS – APPLICATION SURVEY/INSTALLATION INSTRUCTIONS/ USAGE MANUAL

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ATTENTION:

Before using Sturdy-Lite aluminum Loading Ramps as Ramp-Levelers via Conversion Kit (sold separately), read this Manual in its entirety. The end-user ("You"), must ensure that all Sturdy-Lite Ramp-Levelers are installed, used, and stored per the procedures described within this Manual. If you are unsure of how to follow any part of this Manual, contact the distributor from whom you purchased your Ramps and/or Conversion Kit, with details on your trailer (make, model, requested measurements, etc) so that they may properly advise as to selection and usage of the Conversion Kit specific to your Trailer.

ATTENTION:

The Federal Motor Carrier Safety Administration (FMCSA) specifies the minimum performance criteria for cargo securement devices and systems, as managed by the U.S. Department of Transportation (U.S. D.O.T.), in §393.102 of their Federal Regulations publication. You are responsible for ensuring that cargo article weight limits and load shifting protection are within tolerances of this Regulation, consistent with the installation and usage instructions of this Manual.

WARNING:

Improper installation of a Ramp-Leveler may result in insecure trailer cargo which can result in serious property damage, personal injury and/or death. If the procedures described within this Manual cannot be followed at any time, you, the end-user, are responsible for ceasing use of Ramp-Levelers until such procedures can be resumed.

WARNING:

You must exercise caution at all times when installing, using, uninstalling, and storing Ramp-Levelers per the procedures described in this Manual. If, at any point during a procedure in this Manual you are unable to continue unassisted, it is your responsibility to discontinue the procedure and seek assistance from a qualified person or persons.

NOTICE/WARNING:

Upon initial possession, and before & after each set of cargo hauled by using Ramp-Levelers as installed per this Manual, you must visually inspect each Ramp-Leveler assembly along all visible surfaces and all weld junctions for any signs of material yielding (i.e. bent/deformed metal) and/or failure (i.e. cracking/tearing of material). If you observe any yielding and/or failure whatsoever, you must avoid using the Ramp-Leveler assembly indefinitely, and contact Sturdy-Lite or a local distributor to inquire about a new unit.

Pre-Install Application Survey

Supplies needed:

(Qty: 1) tape measure (25' or longer)
(Qty: 1) electronic calculator
(Qty: 2 per Ramp-Leveler unit) 12"-long lengths of rope or string (for pocket place markers)

1) Obtain the value of the total weight of the cargo which you will be planning to haul using Ramp-Levelers, and record here as ***Total Cargo Weight (TCW)*** = _____ lb. You will refer to this ***TCW*** value in Step **(6)**.

2) From either side of the Trailer, using the tape measure, measure the height differential ("Drop Height") between the upper and lower decks of your Trailer, as shown in Figure 1 below:

Figure 1: Measuring the overall height differential ("DH") between the upper and lower decks of your Trailer

NOTE:** *if* you will have dunnage items on the upper deck for side (un)loading access, the height of the dunnage *should be added to* the overall Drop Height (DH)*** measurement.

→ Record as ***Total Drop Height (DH + height of dunnage as-placed on upper deck)*** = _____ inches. You must report this value to your sales representative when ordering a Conversion Kit.

Sturdy-Lite Ramp-to-Ramp-Leveler units are made to equal the Total Drop Height (with or without dunnage on the Trailer's upper deck surface). As such, the Total Drop Height measurement **must be** within plus-or-minus one inch (+/- 1") of the overall height of each Ramp-Leveler once appropriate timbers are installed in the Ramp-Leveler's Timber Tabs. For a 20" *TDH,* you will need two (2) 2x4 timbers (ripped from a single 4x4 timber) for each Ramp-Leveler; for a 24" *TDH*, you will need two (2) 4x4 timbers; for a 27" *TDH,* you will again need two (2) 4x4 timbers, as well as one (1) 4x6 aluminum tube shim (provided by Sturdy-Lite) along with custom Bridge Adapters.

If ***TDH*** is not within +/- 1" of each Ramp-Leveler's overall height, then you must avoid using any Ramp-Leveler(s) in-possession and obtain correct units.

3) Measure the total length of upper deck distance available for use with your cargo, as depicted in Figure 2 below (shown with the entire upper deck length available):

Figure 2: Measuring the Trailer's upper deck length available for use (entire deck shown available in this view)

4) Record as ***Upper Deck Length (UDL)*** = _____ ft
*NOTE: You must ensure that your hauling situation provides for this value to be at least eight feet, as this Manual's application logic does not provide for using Ramp-Levelers to haul cargo without such a substantial portion of the Trailer's upper deck for front-end cargo support.

5) Measure (or obtain from the cargo supplier) the overall length of the cargo which you plan to haul. Record here as ***Cargo Length (CL)*** = _____ ft

6) Using the calculator, subtract ***UDL*** from ***CL*** and record here: ***(CL – UDL)*** = _____ ft . You will refer to this value in the next step.

7) Using the values obtained for ***TCW*** and ***(CL – UDL)*** in steps **(1)** and **(6)** above respectively, use the following table to determine the number of Ramp-Levelers which are required for your hauling conditions:

Table 1: Number of Ramp-Levelers required, *N*, as-determined by TCW and (CL-UDL) values

Number of Ramp-Levelers required, **N**	If **(CL–UDL)** is →	Less than 13'	Between 13' and 25'	Between 25' and 37'	Between 37' and 49'
If **TCW** is:					
Less than 30,000 lbs		**1**	**2**	**2**	**3**
Between 30,000 lb and 40,000 lb		**1**	**2**	**3**	**3**
Between 40,000 lb and 55,000 lb		**2**	**3**	**3**	**4**
Between 58,000 lb and 75,000 lb		**3**	**4**	**4**	**5**

Record as ***Number of Ramp-Levelers***, ***N*** = _____

8)

a) Take the value of ***(CL – UDL)*** recorded in Step (6), and using the calculator, divide this number by the value of ***N*** recorded in Step (7). Record here as ***Spacing Estimate (SE)*** = _____ ft.

b) Now, if the value computed for ***SE*** is not a whole number (e.g. 12.333) and/or is odd (e.g. 13), it must be rounded down to the nearest even number consistent with your Trailer's lower deck side rail pocket spacing (since many Trailer models have lower deck side rail pockets spaced apart at 2 feet [+/- 1/8”] on-center along the intermediate span of the lower deck, the rounded-down value would often result in a value such as 10 or 12 feet).

→ Record this rounded-down value here as ***Effective Spacing (ES)*** = _____ ft

c) Note that this rounding process will result in the rear-most segment of the cargo being hauled to extend beyond the rear-most Ramp-Leveler – this is acceptable for configuration while in-use for hauling as long as the length of such segment is less than two feet. If such length is greater than two feet, you must examine the possibility of repositioning the cargo's distance length-wise along the upper deck and/or changing the location of the rearmost Ramp-Leveler. If you cannot come to a definitive conclusion on the manner of resolving this issue for your setup configuration, please contact the distributor from whom you purchased your Ramps and/or Conversion Kit for consultation.

9) Since many Trailers have irregular pocket spacing near the extremities of the lower deck's length-span, the foremost pocket on the lower deck side rail to the drop deck wall must be considered for final designation of the specific pockets to be used for installing Ramp-Levelers, per the following:

a) Starting from the "driver's side" of the Trailer, measure the distance in inches from the drop deck wall to the center-line of the foremost lower deck side rail pocket, as illustrated in Figure 3 below:

Figure 3: Measuring the distance from the drop deck wall to the center-line of the foremost lower deck side rail pocket

Record as ***Foremost Stake Pocket Distance, (FSPD)*** = _____ in.

Now, after reading scenarios **(b)(1) - (b)(2)** below, you will determine the location of the first pocket. In either, you will mark each pocket designated for use by tying a piece of rope/string around one side of the pocket.

b)

1) If the value of *FSPD* is less than nine (9) inches, you will install the foremost Ramp-Leveler in the pocket location equal to the *Effective Spacing* value **as-measured from the foremost pocket's center-line** (in effect, *adding* onto the *Effective Spacing* distance).

2) If the value of *FSPD* is greater than nine (9) inches, you must install the foremost Ramp-Leveler in the first pocket located forward of the *Effective Spacing* value **as-measured from the foremost Ramp-Leveler and the drop deck wall** (in effect, *subtracting* this distance from the *Effective Spacing* distance).

Each subsequent Ramp-Leveler unit beyond this foremost unit will be simply spaced apart per the *Effective Spacing* value recorded in Step (8)(b) and installed in the pocket located within two inches of the *ES* distance, for both sides of the trailer (driver- and curb-side). Mark the corresponding "curb side" pockets with rope/string accordingly. Note that, while using the decision logic for accommodating the FSPD measurement above, you must make sure that the spacing between:

1) the drop deck wall & the foremost Ramp-Leveler on the lower deck, and
2) each successive pairs of Ramp-Levelers

is as close in value of measured distance as possible for your Trailer.

Installation Instructions

Supplies needed:

(Qty: 1) tape measure

(Qty: 1) Torque wrench* w/ torque-measuring capability and socket for 5-8/"-dia bolt head, used for securing bolts on trailer receiver *NOTE: Do not use an extension on the torque wrench, as the actual torque applied to the bolt will not match the measured torque

(Qty: 1) Open-end or box-end wrench used to temporarily restrain each nut as 5/8" bolt is secured

(Qty: 1 per Ramp-Leveler) Ramp-Leveler Conversion Kit (sold separately)

(Qty: 1 per Ramp-Leveler) DOT-approved 5/16" chain and Clevis hook sets (four pairs per set)

(Qty: 2 per Ramp-Leveler) Load Binder

1) With the appropriate quantity of Ramp sections required for your Ramp-Leveler hauling needs (as-determined from ***N*** per the previous Survey section) placed onto your Trailer's lower deck, take the Bridge Adapter that is solidly welded to a Stake Post and place the Post down into the foremost driver's side pocket marked with rope/string. With the ramp end miters sloping away from the drop i.e. the bottom face of the ramp facing toward the upper deck, slide the ramp into the Bridge Adapter on the driver's-side so that the 1" diameter holes are in-line, as seen in Figures 1 and 2:

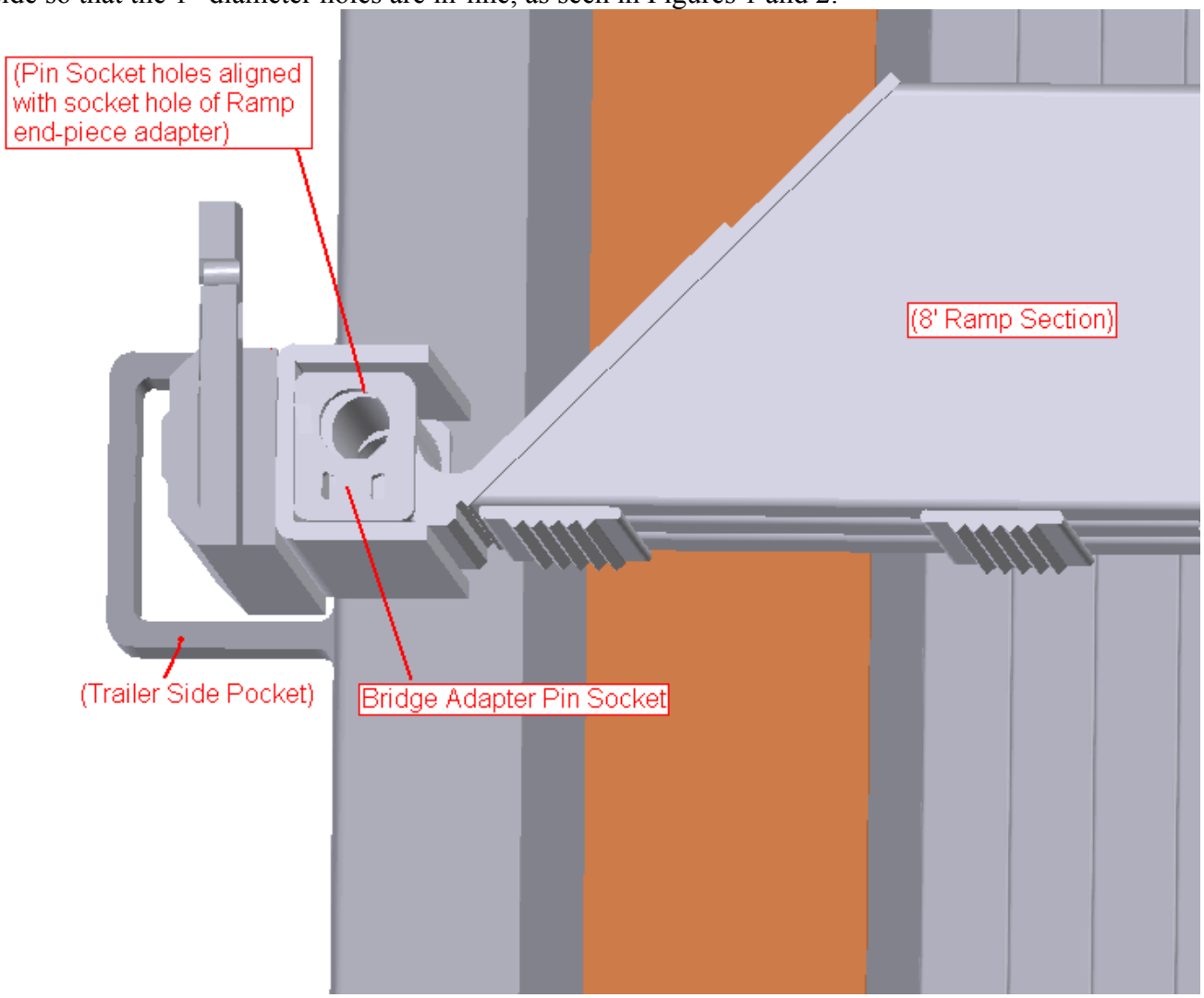

Figure 1 – Overhead View of Ramp End Adapter Aligned with Bridge Adapter Pin Socket

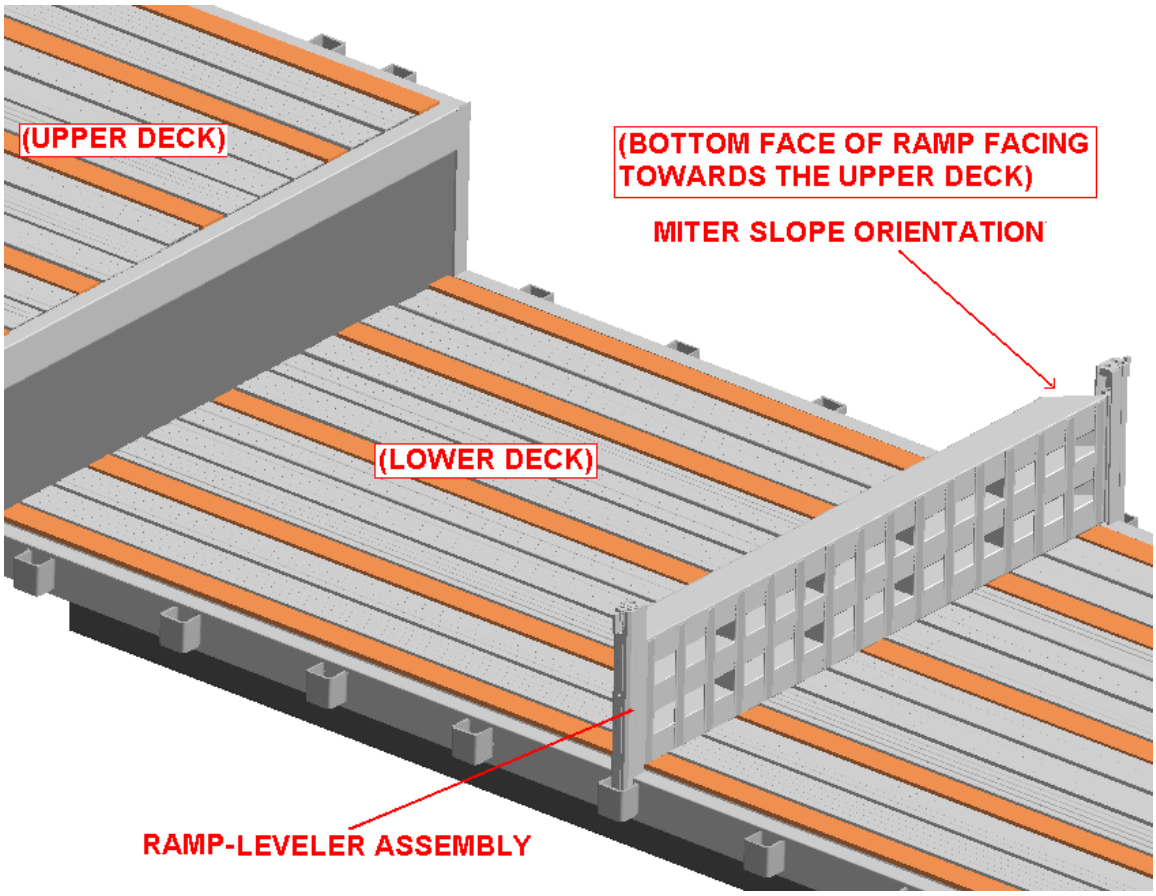

Figure 2 – Perspective Overhead View of Drop-Deck Trailer w/ Ramp-Ramp-Leveler Assembly

2) Take the 7/8”-diameter Socket Rod and slide down into and through the Pin Socket holes until the head rests on the Pin Socket surface, as illustrated in Fig. 3 below:

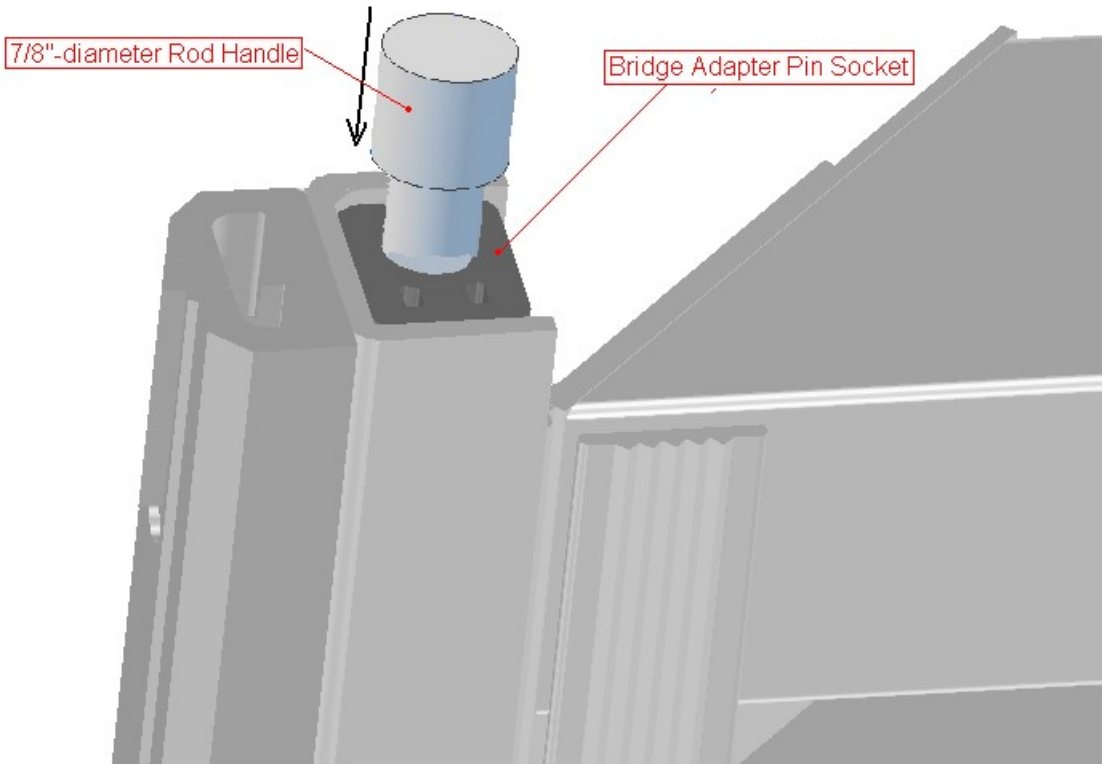

Figure 3 – Perspective Side View of Socket Rod Installed Through Pin Socket and Ramp Adapter

3) Take the Bridge Adapter with shims bolted between its channel and Stake Post and disassemble both of the bolt/washer/nut sets. Then, remove all shims and re-assemble the bolt-nut sets (hand-tightening is fine), making sure that the carriage bolt is oriented such that its head is within the channel component – this serves to temporarily re-couple the Stake Post and Channel components. With the ramp section aligned to the curb-side side rail pocket marked with rope/string, hold this Bridge Adapter in a position such that the Post is inserted into the pocket and butted against the side rail, channel & braces set on the deck platform. Using the tape measure, *approximately* measure the distance between the center of the Ramp-Leveler's end adapter hole and the pin socket hole within the channel, as shown in Figure 4:

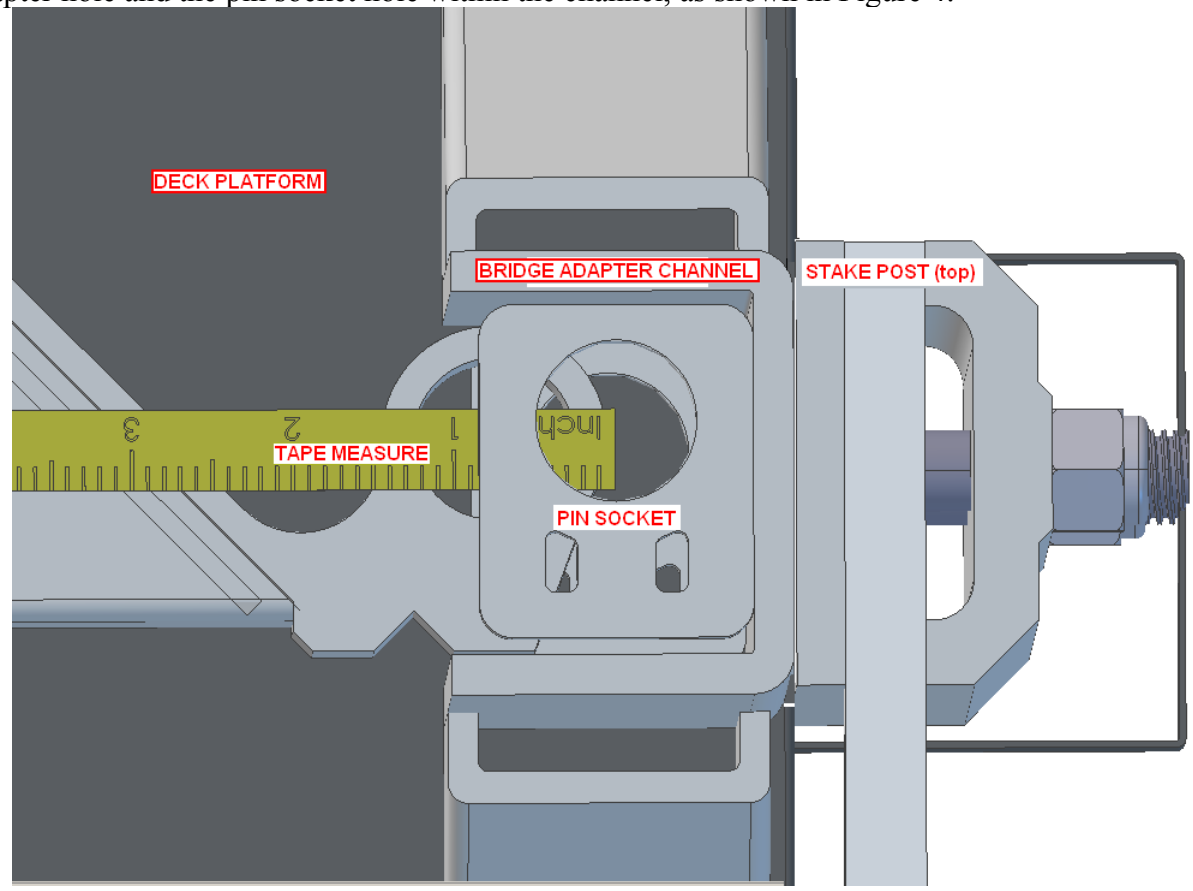

Figure 4: Measuring the distance between a Ramp-Leveler's curb-side end adapter hole center and the center of the pin socket hole within the curb-side Bridge Adapter's channel

Record this measurement here as ***Socket Hole Offset (SHO)***: _____ inches

A one-time adjustment will be required for configuring the curb-side bridge adapter with shim plates such that the pin socket holes will align with the Ramp's end adapter hole, and the interior face of the Stake Post is kept in close contact with the side rail. With shim plates handy, select the combination necessary in order to shim outward to the side rail by an amount equal to or slightly greater than the measurement recorded above. For example, if the measurement in Figure 4 above was either **(a)** 5/16” or **(b)** 3/8”, use one 1/4”-thick and one 1/8”-thick shim to cover a 3/8” distance for either scenario **(a)** or **(b)**. Record the plates required for your application here by thickness:

Plate 1: ____“-thick
Plate 2: ____”-thick
Plate 3: ____“-thick
or
ALL (circle if yes)

Again disassemble both bolt/washer/nut sets, and place the required shim plates as-determined above between the Channel and Stake Post components, making sure that all shim plate bolt holes align with the corresponding bolt holes in the Channel and Stake Post

4) Insert the shaft of each carriage bolt through the holes in the Bridge Adapter's channel portion, then through the selected shim plates, and finally through the Stake Post. Place a flat washer over the threaded end of each bolt, followed by a hex nut. Using the torque wrench, Secure each bolt by torquing both sets to 60 lbs/ft

5) As in Step **(2)** above, take a Socket Rod and slide into and through the hole slots, visually verifying that the rod has been inserted as far as possible, to a depth consistent with that of the Socket Rod installed with the driver's side Bridge Adapter, as illustrated in Figure 5:

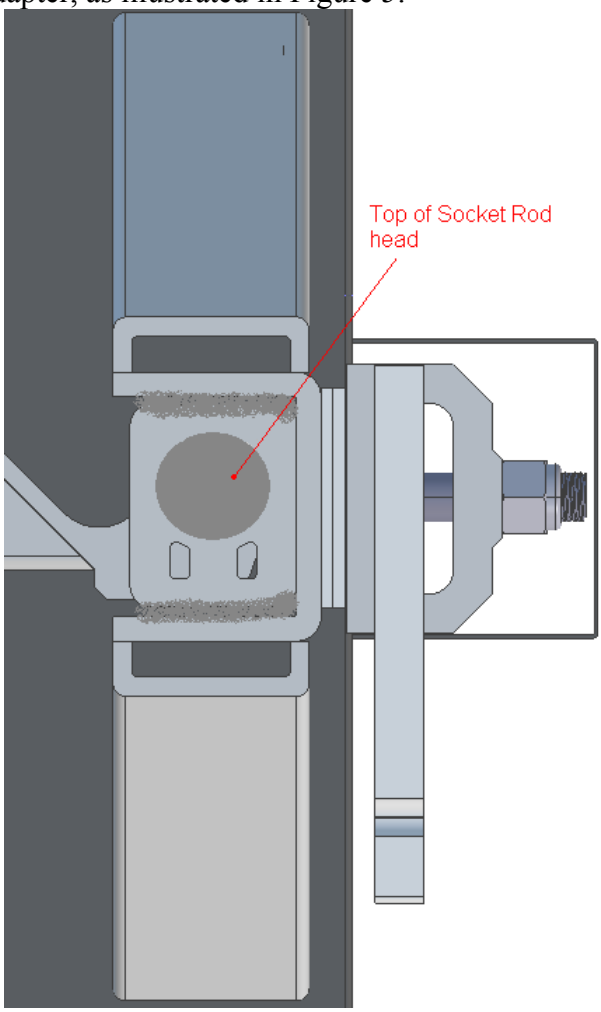

Figure 5: curb-side Bridge Adapter with two shims installed, and Socket Rod inserted through Top Pin Socket, Ramp's end adapter hole and the Bottom Pin Socket, in order

6) Locate four (4) Timber Tabs from your Conversion Kit, and the two dunnage timbers required as per Step (2) of the Application Survey, with the following length tolerance specs, dependent on your Trailer width as follows:

96”-wide trailer: length no greater than 91-1/2”, no less than 89-1/2”
102”-wide trailer: no greater than 97-1/2”, no less than 95-1/2”

Place the Timber Tabs spaced 19” apart onto the skyward face of the Ramp-Leveler, followed by the timbers placed between the Timber tabs in a side by side configuration, as illustrated in Figure 6:

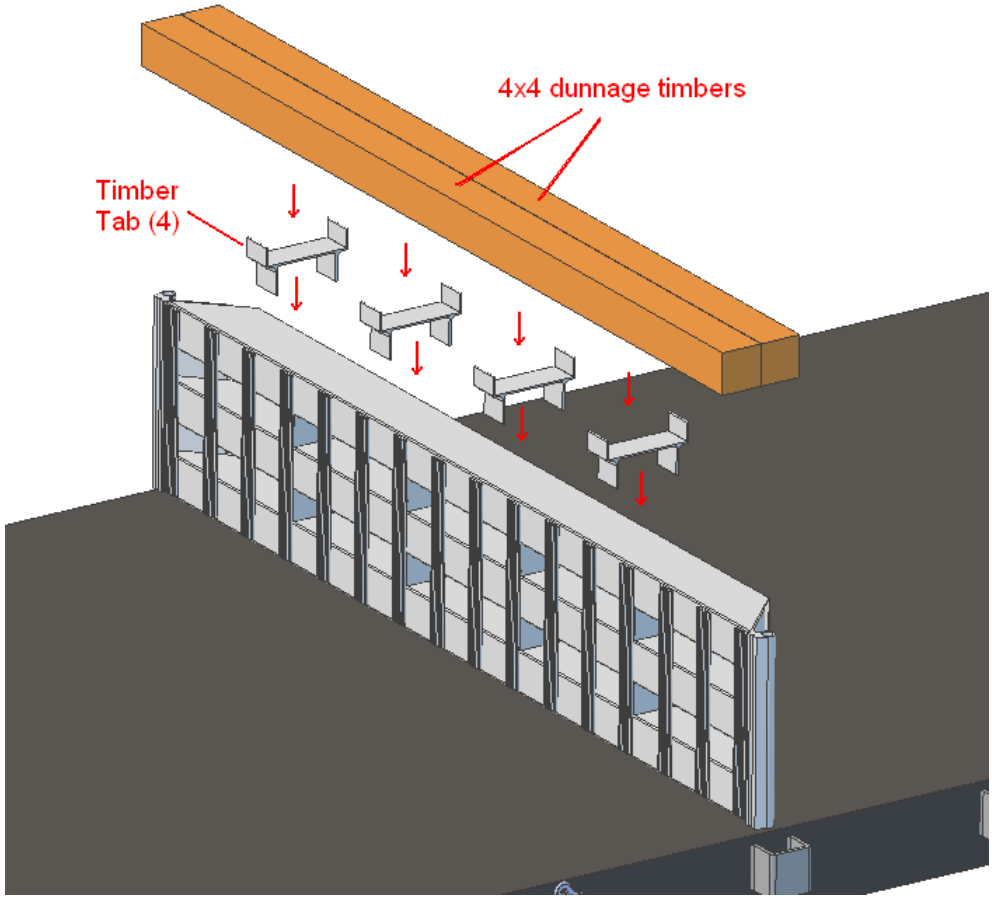

Figure 6 – Exploded & Isolated View of Ramp-Leveler with Timber Tabs and 4x6 Timber

Verify that there is no protrusion of timber from either side. Then, using the tape measure, measure the overall height of the Ramp-Leveler with the timber(s) installed, verifying that it is within 1" of the Total Drop Height (TDH) measurement from Step (2) of the previous Survey Section, as this is required for use.

WARNING:

Under no circumstances whatsoever are you to use more than two (2) 4x4 dunnage timbers, side-by-side, in the top channel of any Ramp-Leveler, as stacking timbers creates an inherently unstable structure. If you cannot meet the above requirement and achieve a finished Ramp-Leveler height within 1" of the Total Drop Height, you must avoid use of your Ramp-Leveler(s) until replacement unit(s) which satisfy this requirement can be obtained.

9) While you remain on the lower deck platform, repeat Steps (1) through (6) above for each additional Ramp-Leveler, as-required. Once all other Ramp-Levelers have been placed per this process, you may return to the ground level.

10) Gathering all required Load Binders and sets of 5/16" chain and Clevis hook, start from the driver's side of the Trailer's lower deck front boundary and go to the first Ramp-Leveler.

11) Take the 24" length of 5/16" chain and one Clevis hook from the first set and secure the Clevis hook through the last chain link on either end. Then, lower this hooked end down into and through the side rail stake pocket forward of the first Ramp-Leveler, and bring back up along the outside surface of the pocket,

forming a loop in the chain and securing the Clevis loop in a chain link such that the loop has minimal slack.

12) Take the loose end of this chain and, with one Load Binder at-hand, insert either Clevis hook tip from the Load Binder into the last chain link.

13) Take the 48” length of chain from the opened chain/hook set and insert the tip of the Load Binder's other Clevis hook into the last link on one end of the chain. Then, take another Clevis hook from the package and secure it through the last chain link on the other end of this chain.

14) While holding the Load Binder up with one hand, take the first two feet of the 48” chain from the Load Binder in your other hand and, holding this segment taut, place the link nearest the Ramp-Leveler Bridge Adapter's slotted bar into the slot. Then, take the remaining loose segment and run it down into the side rail stake pocket aft of the Leveler. Once you have taken the hook & chain through the bottom opening of the pocket as far as the chain's length allows, take the hook in hand and bring it up along the outside area near this pocket, and secure the Clevis hook into the chain link which minimizes slack in the aft segment of chain.

15) Similar to Step (11), wrap the remaining segment of the hooked-end chain around the segment hooked to the Load Binder, circling several times and inserting the Clevis hook's end into the nearest chain link available on the Binder-hooked segment. The results of Steps (10) through (15) here should look similar to that illustrated in Figure 8:

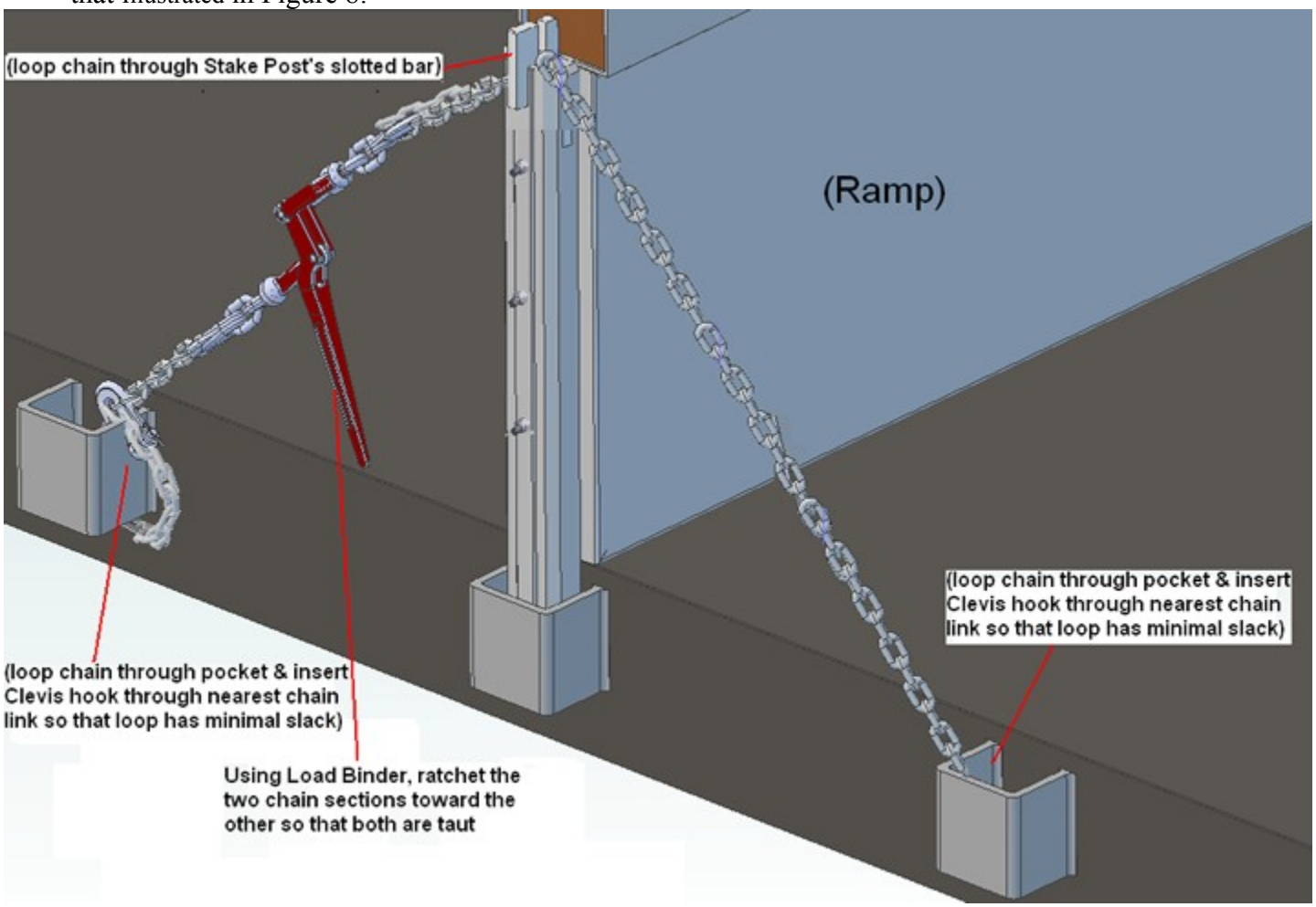

Figure 7: Example view of 5/16” chain looped through slotted bar & wrapped around immediate segment

12) Take the loose end of this chain and, with one Load Binder at-hand, insert either Clevis hook tip from the Load Binder into the last chain link.

13) Take a second chain piece from the opened chain/hook-set package and insert the tip of the other Clevis hook from the Load Binder into the last link on one end of the chain. Then, take another Clevis hook from the package and secure it through the last chain link on the other end of this chain

14) While holding the Load Binder up with one hand, take the just-secured Clevis hook on the chain into your other hand and run it down into the side rail stake pocket on the same side which the Ramp-Leveler Stake Post's slotted bar is oriented to, adjacent to the pocket which the Post is set into. Once you have taken the hook & chain through the bottom opening of the pocket as far as the chain's length allows, take the hook in hand and bring it up along the outside area near this pocket, and loop this remaining free segment of the hooked-end of the chain over the segment of the chain hooked into the Load Binder.

15) Similar to Step (11), wrap the remaining segment of the hooked-end chain around the segment hooked to the Load Binder, circling several times and inserting the Clevis hook's end into the nearest chain link available on the Binder-hooked segment. The results of Steps (10) through (15) here should look similar to that illustrated in Figure 8:

Figure 8: Illustrated view of 5/16” chain looped through slotted bar & side rail pocket, hooked at all ends & slack minimized

16) Use the Load Binder's ratchet mechanism to make suspended chain segments on each side as taut as possible.

17) Repeat Steps **(10)** through **(16)** for each Ramp-Leveler placed along the lower deck after the foremost unit. Note that you may deplete supplies from the chain & Clevis hook sets in continuous fashion instead of opening a new packet for each Ramp-Leveler (all chains & hooks are identical).

18) Gathering all remaining chain & hook set packets, go to the curb side of the Trailer's lower deck, and starting from the foremost unit, perform the chain-Clevis hook-Load Binder assembly process as-described in Steps (10) through (17) above.

Usage and Maintenance Requirements

Usage:

1) You must obey the loading requirement directives listed on the Ramp-Leveler's warning labels at all times. Each Ramp-Leveler was designed and manufactured using ASTM International and AWS written quality control specifications and procedures. The satisfactory performance of each Ramp-Leveler per the parameters specified on each unit's performance notification label as follows:

AS DESIGNED AND MANUFACTURED, THESE RAMP-LEVELERS (BRIDGES) ARE LOAD RATED FOR A UNIFORMLY-DISTRIBUTED LOAD CAPACITY OF 20,000 LBS OVER AN 8' WIDE SPAN. CONCENTRATED LOAD OF 9,500 LBS OVER VERTICAL POST; 2,650 LBS ELSEWHERE. UNIT MUST BE SECURED BY D.O.T. 5/16 CHAIN IN CHAIN SLOTTED BRACKET PROVIDED."

The term "*uniformly distributed*" in the context of the above notification indicates that, for the Ramp-Leveler to perform a load-supporting function at a capacity consistent with its spacing and configuration along with:

1) other Ramp-Levelers as-prescribed in the Application Survey above
2) the Trailer's upper deck platform length availability
3) the total cargo length and weight
4) Regulations on the structural integrity and installation requirements of all securement items (straps, chains, etc)

2) The cargo must be configured in a manner such that the piece/weight distribution of cargo is within a margin of +/-5% for each 12 inches (1 foot) on either side of width/span of a Ramp-Leveler supporting cargo, and all required units are spaced per the Survey above, and installed per the Installation Procedure. If you haul any cargo with a weight distribution across the width/span of the Unit that is concentrated (that is, a cargo load with 15% or more of its weight being exerted within a width/span of one foot [1']), the primary load rating (20,000 lbs total) cannot be satisfied and liability of structural performance for such Ramp-Leveler unit is disclaimed by Sturdy-Lite.

3) The Ramp-Leveler must be secured and maintained per DOT §393.102

In short, a system is only as strong as its weakest link. You, and your managing associates involved in the business of cargo transportation, must verify that the integrity of each item involved in transport meets or exceeds the proper regulatory specifications.

WARNING: As mentioned in Step (2) of the Survey Section and Step (8) of the Installation Section of this Manual, under no circumstances whatsoever are you to use more than two (2) 4x4 dunnage timbers in the top channel of any Ramp-Leveler. If you cannot meet the aforementioned requirement, you must avoid use of your Ramp-Levelers until replacement unit(s) which satisfy this requirement can be obtained.

Maintenance:

Ramp-Levelers are to be inspected per the directive specified in the Warning/Notice listed in the Important Safety Notices section, and stored per the Storage Procedure described in the following section of this Manual.

Uninstall & Storage Procedures

Uninstall:

1) After completely unloading all cargo hauled using Ramp-Levelers, starting from the front end of the driver's-side of the trailer, go to the foremost unit, disengage the Load Binder ratchet lock and remove its Clevis hooks from the chains. Then, remove each chain from its anchor point as mentioned in Steps (11) through (15) of the Installation Section above. Next, remove the dunnage timbers from the Ramp-Leveler's Timber Tabs.
2) Go to each additional Ramp-Leveler unit beyond the foremost, and repeat the Load Binder & chains removal process as in Step (1).
3) Once all units have had their driver's-side anchoring components removed, go to the curb-side of the trailer, and starting from the back, work your way to the foremost unit, removing Load Binder and chains per Step **(1).**
4) Finally, ascend to the lower deck platform and remove each Bridge Adapter unit from its installed location, one Leveler at a time, by first removing the Socket Rod, and then working the unit away from the Ramp-Leveler's end adapter and out of the side rail stake pocket.
5) Now that you have uninstalled your Ramp-Levelers, you must immediately proceed to the Storage procedure below.

Storage:

You may store your Ramps in one of two methods: 1) by grouping together near the lower-to-upper deck drop wall and securing to the deck with Ratchet Straps, or 2) by using Sturdy-Lite Ramp Storage Rack sets (sold separately).

1st method

Supplies needed: (Qty: 1 per Ramp-Leveler) Ratchet Strap, labeled with a working load limit spec to meet/exceed DOT regulations (18' or longer; supplied with Trailer or bought separately)

1) After bundling and storing the chain-Clevis-Load Binder set, dunnage timbers and Bridge Adapters from each Ramp-Leveler unit, while standing on the lower deck, take the foremost Ramp-Leveler and place as close as possible to the drop deck wall at the front of the lower deck, setting it on its bottom side. Then, take a Ratchet Strap and, with one end hooked or spooled to an anchor point on one side of the Trailer, and run one end over the top of the ramp across the width of the trailer
2) Take each additional Ramp unit one-at-a-time and place as close as possible to the unit just placed near the lower deck front, again setting the unit on its bottom side. As in step (1), take a ratchet strap with one end hooked or spooled to an anchor point on one side of the Trailer, and run one end over the top of the ramp across the width of the trailer
3) Once all Ramps have been placed together toward the drop deck wall and Ratchet Straps set in place per Step (1), you may return to ground level and, starting from the driver's-side of the Trailer, using the ratcheting mechanism and the Trailer OEM's specified anchor points for strapping hooks, secure each Ramp such that it cannot be moved laterally (across the Trailer deck's width), transversely (forward/backward along the Trailer's length), or vertically (up). Verify from both the driver's-side and the curb side of the Trailer for each unit that:
   a) the strapping unit is taut
   b) the ratchet mechanism's lock device is engaged, and
   c) all anchor points for the strapping & mechanisms are secure
4) You should perform periodic checks of each Strap and Ratchet mechanism per (3)(a)-(c) above, verifying tautness of all straps and that all locks are engaged, before and after traveling with the units stored in the manner specified above

2nd method – (See Ramp Storage Rack User's Manual for installation instructions)