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LOAD LEVELERS FOR DROP-DECK TRAILERS – APPLICATION SURVEY/INSTALLATION INSTRUCTIONS/ USAGE MANUAL

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ATTENTION:

Before using Sturdy-Lite Load Levelers, read this Manual in its entirety. The end-user ("you"), must ensure that all Sturdy-Lite Load Levelers are installed, used, and stored on your Trailer 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 Load Levelers, with details on your trailer (make, model, requested measurements, etc) so that they may properly advise as to selection and usage requirements 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 Load 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 Load Levelers until the procedures below can be resumed.

WARNING:

You must exercise caution at all times when installing, using, uninstalling, and storing Load 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 Load Levelers as installed per this Manual, you must visually inspect each Load Leveler unit 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). <u>If you observe any yielding and/or failure whatsoever, you must avoid using the Load Leveler unit indefinitely, and contact Sturdy-Lite or a local distributor to inquire about a new unit</u>.

Pre-Install Application Survey

Supplies needed:

(Qty: 1) tape measure (25' or longer)
(Qty: 1) electronic calculator
(Qty: 2 per Load Leveler) 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 Load 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)*** =***TDH***= ___ inches

Sturdy-Lite Load Levelers 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 quarter of an inch (+/- 1/4") of the overall height of each Load Leveler when one (1) 4x4 wooden dunnage timber is installed in the Load Leveler's top channel. If ***TDH*** is not within +/- 1/4" of each Load Leveler's overall height, then you must avoid using any Load 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)*** = _____ feet.
*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 Load 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)*** = _____ feet.

6) Using the calculator, subtract ***UDL*** from ***CL*** and record here: ***(CL – UDL)*** = _____ feet . 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 Load Levelers which are required for your hauling conditions:

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

Number of Load 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 Load 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)*** = _____ feet.

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)*** = _____ feet.

c) Note that this rounding process will result in the rear-most segment of the cargo being hauled to extend beyond the rear-most Load 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 Load 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 Levelers for consultation.

9) Since many trailers have irregular pocket spacing near the front & rear of the lower deck, 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 Load Levelers on your Trailer, 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)*** = _____ inches

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 Load 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 Load Leveler in the first pocket located forward of the *Effective Spacing* value **as-measured from the foremost Load Leveler and the drop deck wall** (in effect, *subtracting* this distance from the *Effective Spacing* distance).

Each subsequent Load 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 Load Leveler on the lower deck, and
2) each successive pairs of Load 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, 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 bolt is secured

(Qty: 1 per Load Leveler) DOT-approved 5/16" chain and Clevis hook sets (one 24" chain, one 48" chain, and two hooks per set)

(Qty: 2 per Load Leveler) Load Binder

1) With all Load Levelers required for your hauling needs (as-determined from ***N*** per the previous Survey section) placed onto your Trailer's lower deck, take the first unit at-hand to be installed and locate the end which has a Stake Post with three bolt/nut/washer sets installed; using the torque & manual wrenches, disassemble all three sets, removing the Post and shim plates in the process. Set these components on the Trailer's lower deck, near the curb side, convenient to the foremost side rail pocket marked with rope/string.

2) While standing on the lower deck platform of your Trailer, take one Load Leveler unit and, making sure that the end of the unit with the **welded <u>and</u> bolted** Stake Post is oriented to the driver's side of the Trailer, place the Post down into the foremost driver's side pocket marked with rope/string, as shown in Figure 4:

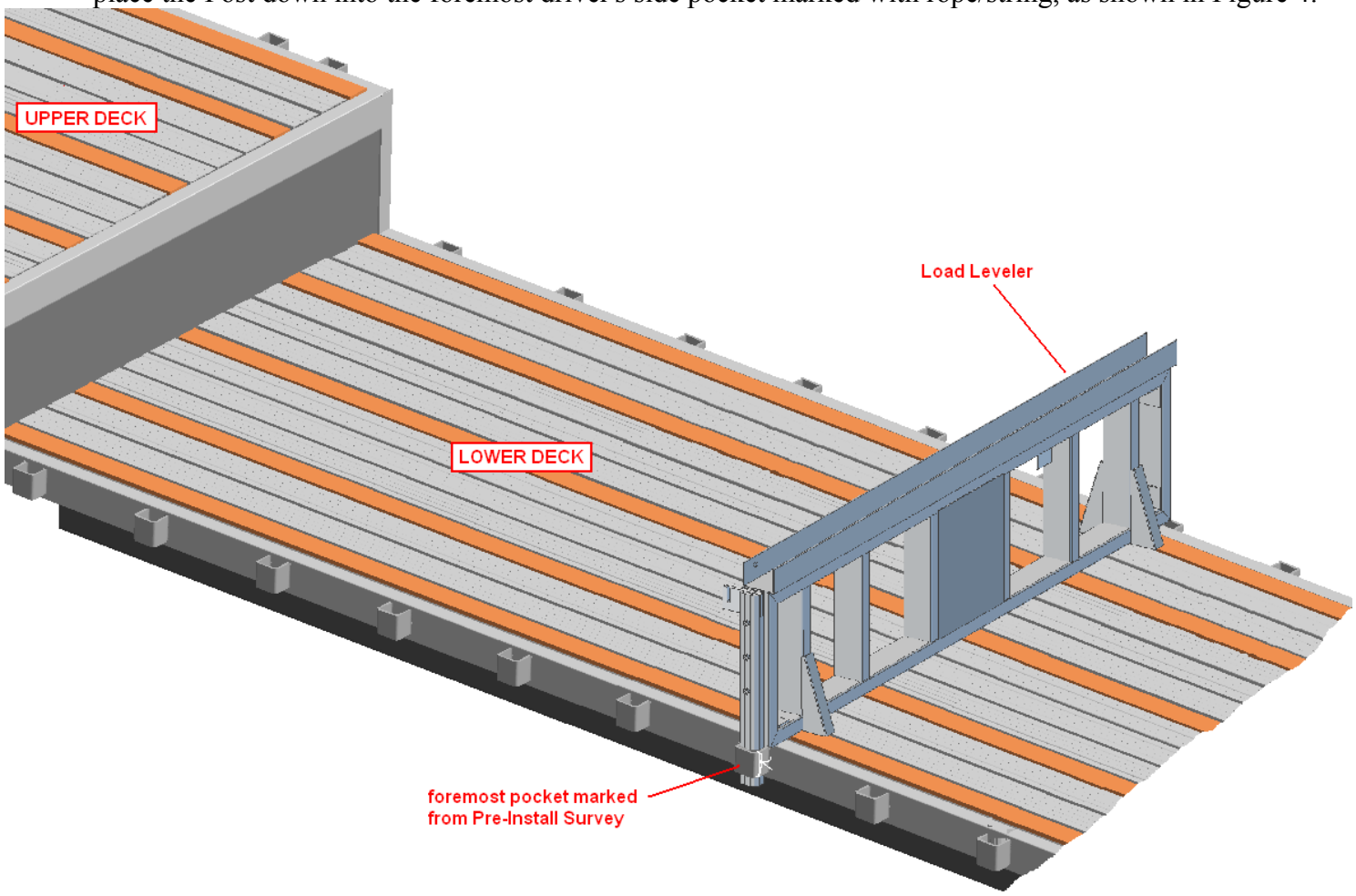

Figure 4: Placing a Load Leveler's welded-side Stake Post into the foremost lower deck side rail pocket marked with rope/string

3) Using the tape measure, measure the distance between the outer edge of the Load Leveler's "curb-side" end column and the edge of the curb-side side rail, as shown in Figure 5:

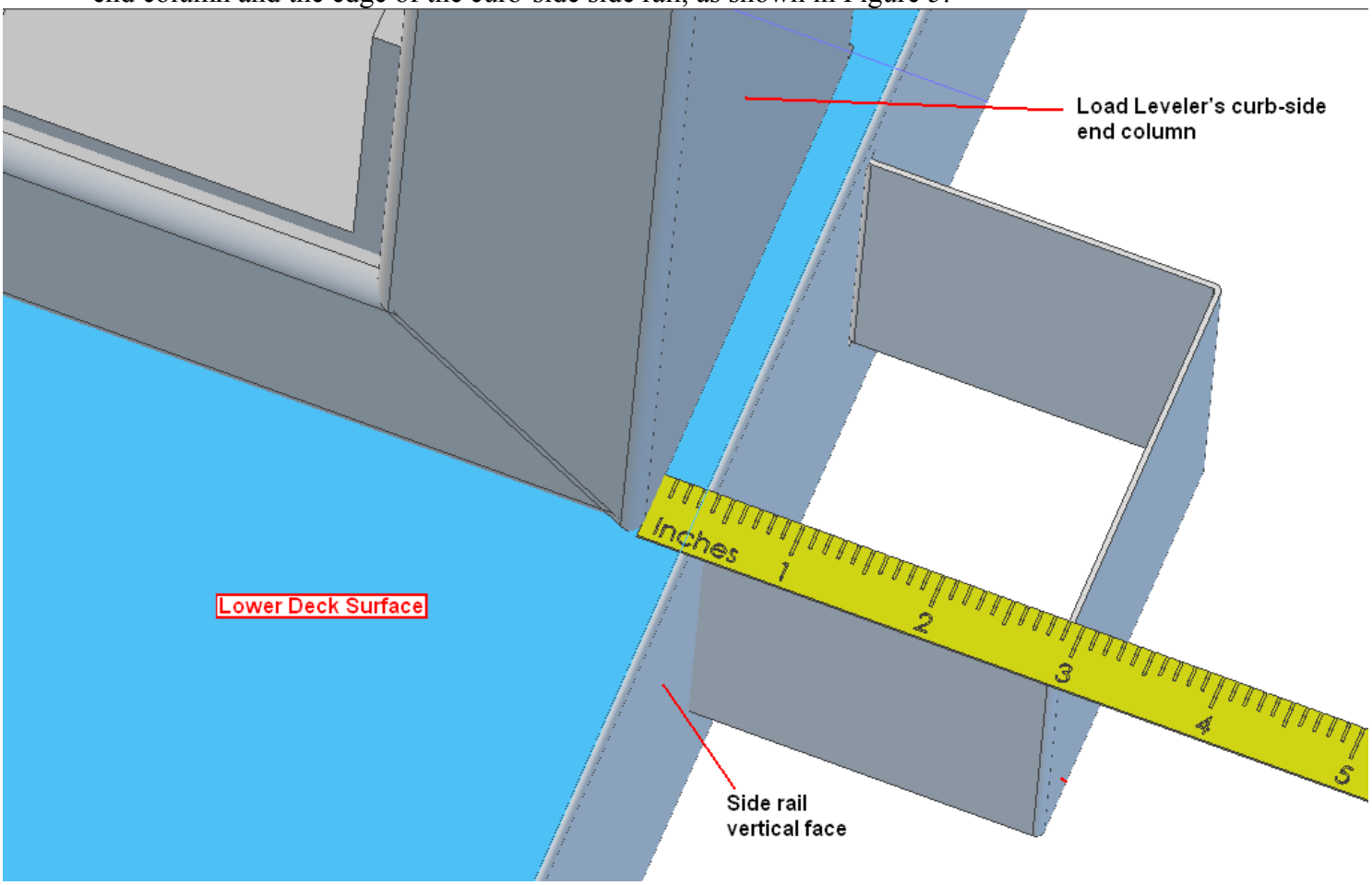

Figure 5: Measuring the distance between a Load Leveler's curb-side end and the edge of the curb-side side rail

4) With shim plates handy, select the combination necessary in order to shim outward to the side rail by an amount equal to or just beyond the measured value. For example, if the measurement in Figure 5 above was either 5/16" or 3/8", use one 1/4"-thick and one 1/8"-thick shim to cover a 3/8" distance for either scenario.

5) With the remaining components set aside from Step **(1)** handy, align the holes in the end column with the holes in the shim plates selected in Step **(4)**, and insert one (1) of the hex bolts into the highest hole on the end column's interior face, and through the aligned shim plate holes. Then, place the Stake Post's highest hole inline with this bolt and push all the way into contact with the outer shim plate – do not secure this bolt with a hex nut, as it will serve only as a support-hold for the shims and Stake Post until the other two bolt/lock nut/hex nut sets are installed correctly in the next step.

6) Insert each of the other two hex bolts one-at-a-time into the middle and lowest aligned hole sets, starting from Stake Post, through shims, and finally through the unit's end column. With the hex nuts and lock washers handy, place one lock washer followed by one hex nut over the threaded end of both of these bolts and torque bolts to 60 lbs/ft, making sure that there is no more than ¼" of bolt shaft exposed for each. Your results should look similar to the illustration as shown in Figure 6:

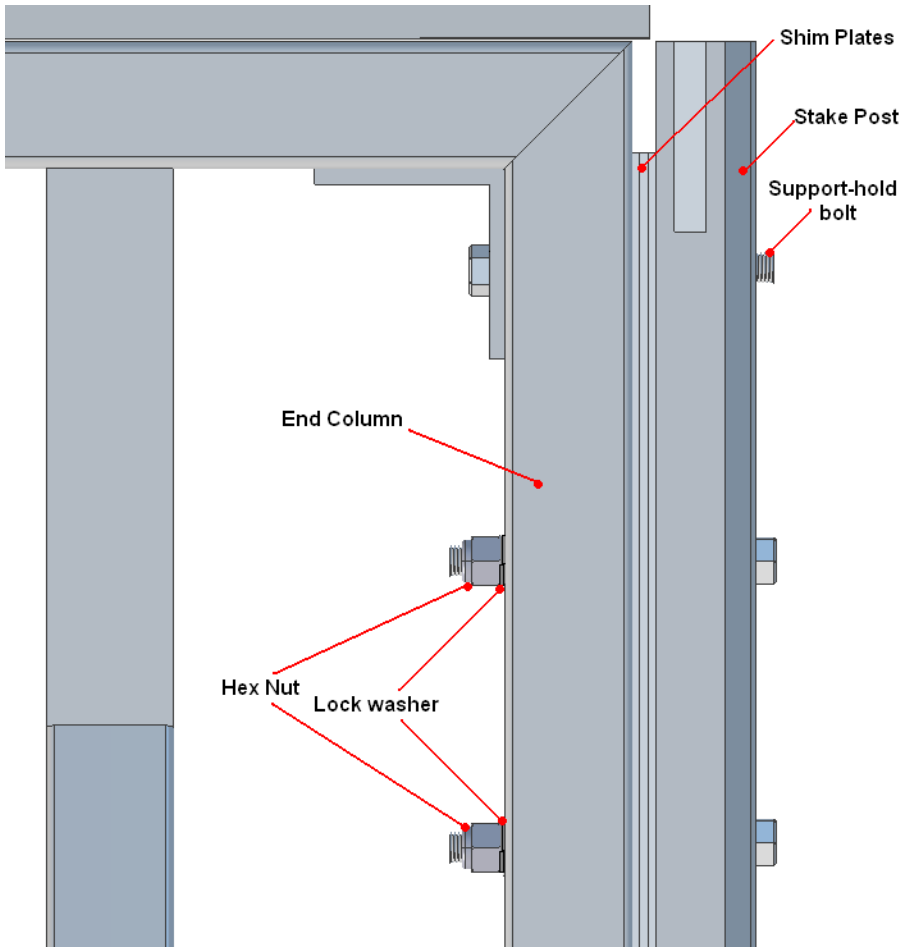

Figure 6: Illustrated view of aligned and installed hex bolt/nut/lock washer components in lower two holes in Load Leveler's curb-side Stake Post-shim plating-end column series

7) Remove the support-hold bolt from the highest hole, and with the last lock washer and hex nut handy, install in the highest hole per procedure used for the other two bolts in Step **(6)**.

8) Locate one 4x4 timber with the following length tolerance specs, dependent on your Trailer width as follows:

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

Place one 4x4 timber into the top channel along the Load Leveler's span, verifying no protrusion from either side. Then, using the tape measure, measure the overall height of the Load Leveler with the timber installed, verifying that it is within 1/4 of an inch 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 anything more than one (1) 4x4 dunnage timber in the top channel of any Load Leveler, as stacking multiple timbers creates an inherently unstable structure. If you cannot meet the above requirement, you must avoid use of your Load 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 (8) above for each additional Load Leveler, as-required. Once all other Load 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 Load 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 Load 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 Load Leveler Stake Post'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:

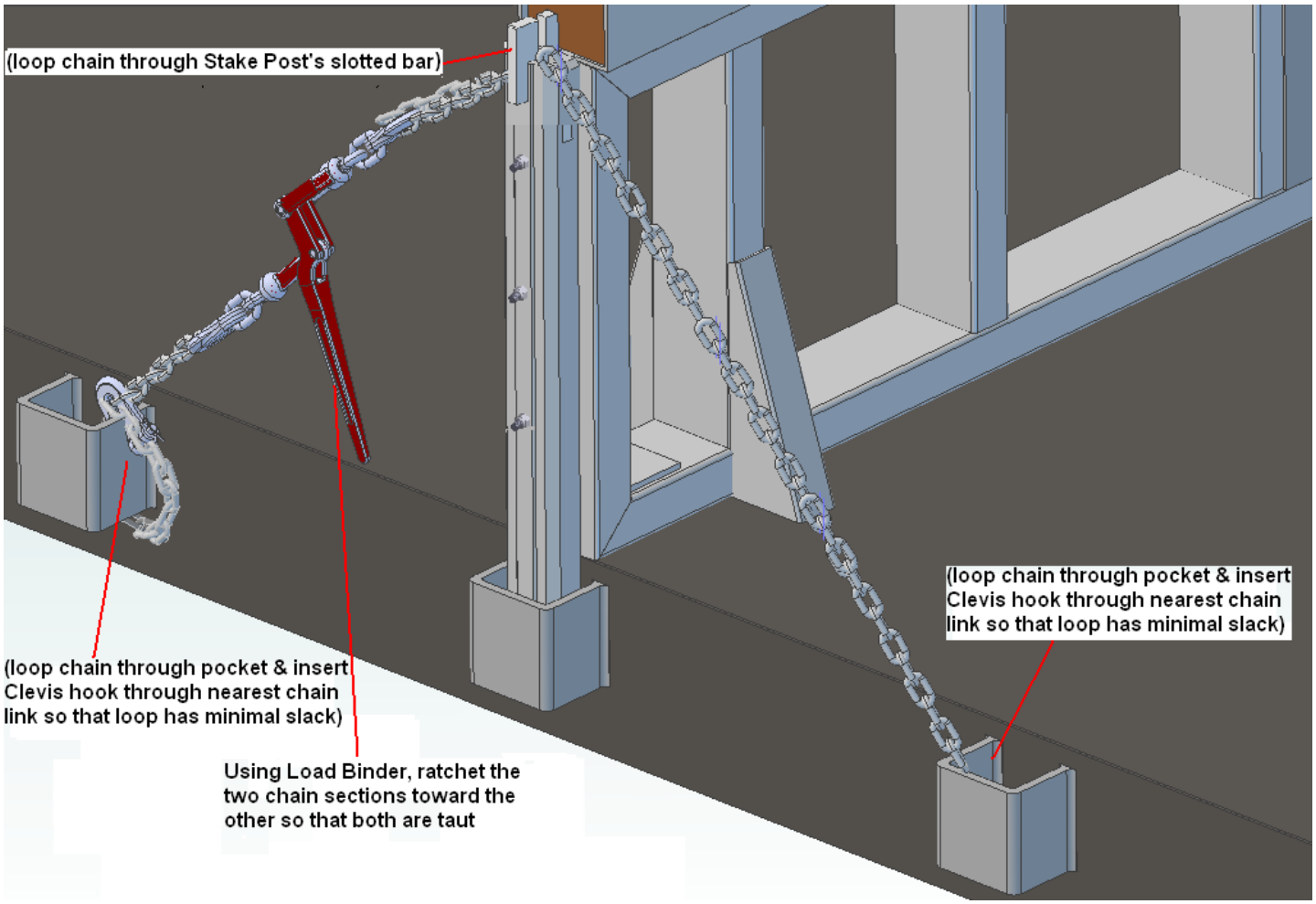

Figure 8: Illustrated view of 5/16" chain looped through slotted bar & side rail pocket, hooked at all ends & slack minimized

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 Load 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 Load 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 Load Leveler's warning labels at all times. Each Load Leveler was designed and manufactured using ASTM International and AWS written quality control specifications and procedures. The performance specification of each Load Leveler per the parameters specified on each unit's performance notification label is as follows:

AS DESIGNED AND MANUFACTURED, THESE LOAD LEVELERS (BRIDGES) ARE LOAD RATED FOR A UNIFORMLY-DISTRIBUTED LOAD CAPACITY OF 20,000 LBS OVER 8' WIDE LOAD LEVELERS. 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 Load Leveler to perform a load-supporting function at a capacity consistent with its spacing and configuration along with:

i) other Load Levelers as-prescribed in the Application Survey section of this Manual
ii) the Trailer's upper deck platform length availability
iii) the total cargo length and weight
iv) DOT regulations on the structural integrity and installation requirements of all accompanying securement items (straps, chains, etc)

2) The pieces of cargo which you will be hauling using Load Levelers must be configured in a manner such that the weight distribution of such across the span of the Leveler is within a margin of +/-5% for each 12 inches (1 foot), and all required Load Leveler 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 Load Leveler that is concentrated (that is, a cargo load with more than 15% of its weight being exerted within a width/span of one foot [1']), the primary load rating (20,000 lbs total effective capacity) cannot be satisfied and liability of structural performance for such Load Leveler unit is disclaimed by Sturdy-Lite.

3) The Load 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 one (1) 4x4 dunnage timber in the top channel of any Load Leveler. If you cannot meet the above requirement, you must avoid use of your Load Levelers until replacement unit(s) which satisfy this requirement can be obtained.

Maintenance:

Load 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 Load 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. Then, remove the dunnage timber from the Load Leveler's top channel.
2) Go to each additional Load 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) Now that you have uninstalled your Load Levelers, you must immediately proceed to the Storage procedure below.

Storage:

Supplies needed: (Qty: 1 per 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 from each Load Leveler unit, while standing on the lower deck, take the foremost Load Leveler and place as close as possible to the drop deck wall at the front of the lower deck; make sure that each Leveler's dunnage timber remains in the channel. Then, take a Ratchet Strap and run one end along the span of the unit's timber installed in the top channel, making sure that there is enough extra length of strap hanging out of each end of the channel in order to avoid slipping out of one end.
2) Take each additional Load Leveler unit one-at-a-time and place as close as possible to the unit just placed near the lower deck front, taking care to ensure that each successive unit's Brace component parts are in a staggered configuration to the previously-placed unit, as illustrated in Figure 9 below:

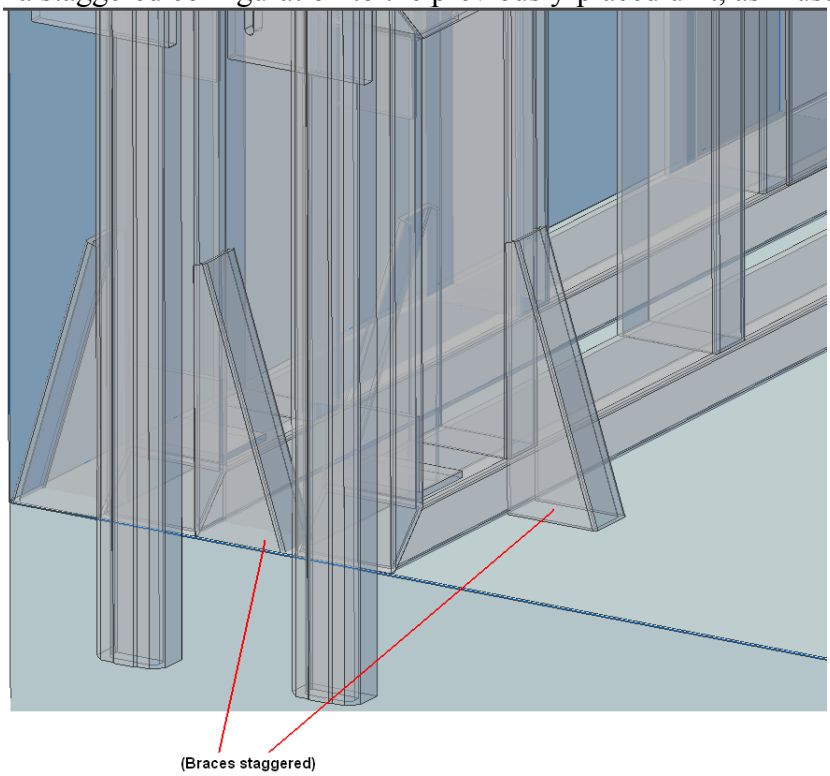

Figure 9: Illustrated view of two Load Leveler units, one unit having Brace components at a closer spacing to the middle of its span than the other

Repeat the process of placing a Ratchet Strap across each Load Leveler placed in short succession as far toward the drop deck wall as possible with the other units, one-at-a-time. An illustrated view of two Load Levelers with straps extending from the top channel down along the ends & the lower deck side rail is shown in Figure 10:

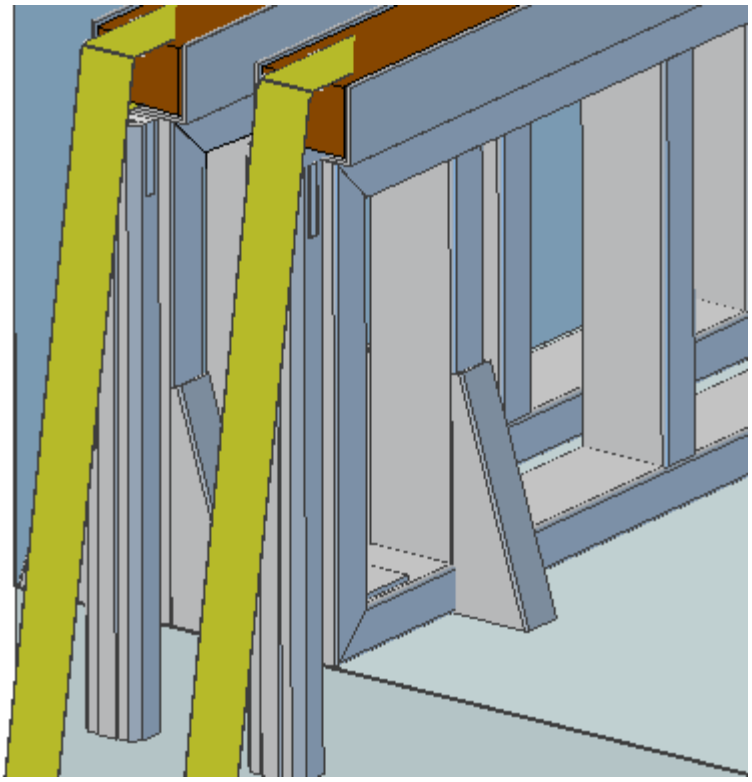

Figure 10: Illustrated view of two Load Leveler units with a Ratchet Strap resting within each unit's top channel, and extending down along the ends

3) Once all Load Levelers 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 Load Leveler 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 may elect to take the extra precaution of securing your Load Leveler(s) with a locking ratchet mechanism or steel chain & key/pad lock in order to deter theft. You may install such an assembly by running one end of the chain(s) used through the void between the vertical end column member and the nearest interior vertical column on either end of each Load Leveler.

5) 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.