Cable replacement in my 1998 Hilo 24TD

In the fall of 2004, we had a hurricane (or what was left of one anyway) rapidly approaching our area. I had already gassed up all the generators and huddled up the flashlights, checked the batteries, and suddenly remembered my LED flashlights were still in the Hilo in the yard. So I head out to the trailer to retrieve my flashlights and then hunker down for the coming storm.

Now picture this in your mind, it's 40-50mph winds, raining sideways, thunder, lightning, and getting very nasty. They have tornado warnings in my area as well. My trailer is only about 10' out the back door so out I run in my shorts and t-shirt gritting my teeth as the cold rain blows on my glasses and soaks me to the bone. I start to raise the top half, and about halfway up I hear the one sound a Hilo owner never wants hear even under the best weather conditions, "bang". Yep! You guessed it, the front right cable has given up the ghost and broken! Now what?

Well, I start bellowing for the wife and after a minute or two she finally hears me over the storm and comes down to see what the problem is. I finally convince her to sally forth into the maelstrom of rain and she bumps the lift motor down while I, being the strapping young man I am (or at least think I am) lift the corner to try and keep it level as it comes down. Amazing what you can do under stressful conditions, and better yet it's amazing what prescription strength Motrin can do for a pulled muscle or two. So much for those LED flashlights. Get it down, lock it up, drip all the way back up the basement stairs and while I hunting for a dry pair of shorts, pop - out goes the power. This is how I was introduced to the wonderful world of replacing my Hilo lift cables.

In all fairness I must admit I did notice some rusting and a few stray cable strands a few months earlier. I did not expect a catastrophic failure and thought this would be a good winter project (besides, who likes to sweat in the hot Georgia sun in the summer?). So I had already ordered a replacement set of 4 cables and the tools necessary to complete the job. Larry Mills and Charlie Cockerel at Hilo (Charlie has since retired) were an invaluable source of information and very willing to help me with my questions and parts even though this was a DIY project. This is how I made my repairs. I don't warranty this is the correct way, the safest way, or advisable. Anyone who tries such a DIY project does so at their own risk (disclaimer for the lawyers in the bunch!).

Here is the "short version" of how it works:

1. Either buy a set of pre-made cables for your size trailer from Hilo, J&R Trailer in Butler, OH or have a local shop make you a set. The cable is simply 3/16" aircraft cable (galvanized steel cable) with a threaded rod swaged onto one end and a aluminum sleeve swaged on the other after it loops around a aluminum thimble. I ordered a set of 4 cables from H&T (this is now named J&R Trailer) for $120 total and the set included all the thimbles and swage sleeves.

2. Tools:

- You will need some type of swaging tool. This is a tool that crushes the aluminum sleeve around the looped cable to lock the thimble in place. There are several designs that will work. And ease of use as well as price will vary. I bought a very nice commercial swaging tool that looks like a big bolt cutter on E-Bay for about $25 new. The model I bought is normally around $125 to $150 if you buy it elsewhere. The model I bought is a HSC-600 and it also has a cable cutter built in. Try a google search for "swaging tool" and you should find some. Tractor supply also carries them as well as most boating supply stores. Detailed swaging instruction are at the end of this document.

- Various common hand tools such as wrenches to fit your bolts

- Jack stands to support your trailer off the ground and give you room to crawl around and work under the trailer

- A hydraulic jack - bottle jack or roll around floor models both work equally as well.

- 4x4 blocking material - this is used to support your top half while the cables are disconnected. You will need to do some work inside the trailer with the cables off and the top half "up".

Here are some photos of the tools I would recommend, but you can use whatever works well for you:

Bolt compression Swaging tool

I started my repair project by moving the trailer to the flat part of the driveway near the house. I then used my floor jack and jack stands to raise the entire trailer off the ground as much as I could. This accomplished two things; 1) it made it easier for me to crawl around under the trailer to work on the cables and check the rest of the lift system; 2) it made the trailer super stable - no chance of it swaying with me walking around inside as the entire weight of the frame is on those 4 jack stands and they have very wide bases. You can do this with the trailer on the tires on the ground, but there is no comparison to the ridged feeling with it on those oversized jack stands. It has to be safer (and it feels safer to me).

Now it's time to get the top half up so you can work on it. Problem is you have a broken lift cable and the top is not going to raise like normal. You need to support the corner with the broken cable and you have several options on how to do this.

- Snag a few "volunteer's" to help manually hand lift the corner with the broken cable. It is possible for one or two burley adults to just grab under the edge of the top half and use muscle power to get the job done. If you don't have burley adults available, then throw a pizza party for some of your daughter's friends, err... I mean volunteers. High School kids have lots of energy!!!

- Or go the “tool time” way and use a tool!!! Floor jacks and bottle jacks work great, but you will need some intermediate size blocking as you can only lift so far before the jack tops out. This is the way I did it. I cut some 4x4's in different lengths. I put a short length on top of the jack, and as the wife bumped the lift button so the lift motor would raise the other cables, I just pumped my floor jack until it would not go any higher. I then measured the distance from the frame rail to the bottom of the top half and cut a 4x4 blocking ½" shorter than this. I then set this 4x4 on the frame rail and lowered the top half that ½" so it carries the weight of the bad corner on the blocking to the frame rail. Now I just lower the floor jack all the way, get another longer piece of 4x4 and repeat the above until I get the top half all the way up.

- Once the top half is up, I cut four 4x4 blocking pieces to the same length (I measured the corner of the trailer that was at the proper finished height). Then I used the jack and blocking to lift each corner that last ½" and put the final blocking under each corner at the frame rail for support. I then lowered each corner on the blocking. The blocking is more than capable of carrying the weight of the top half.

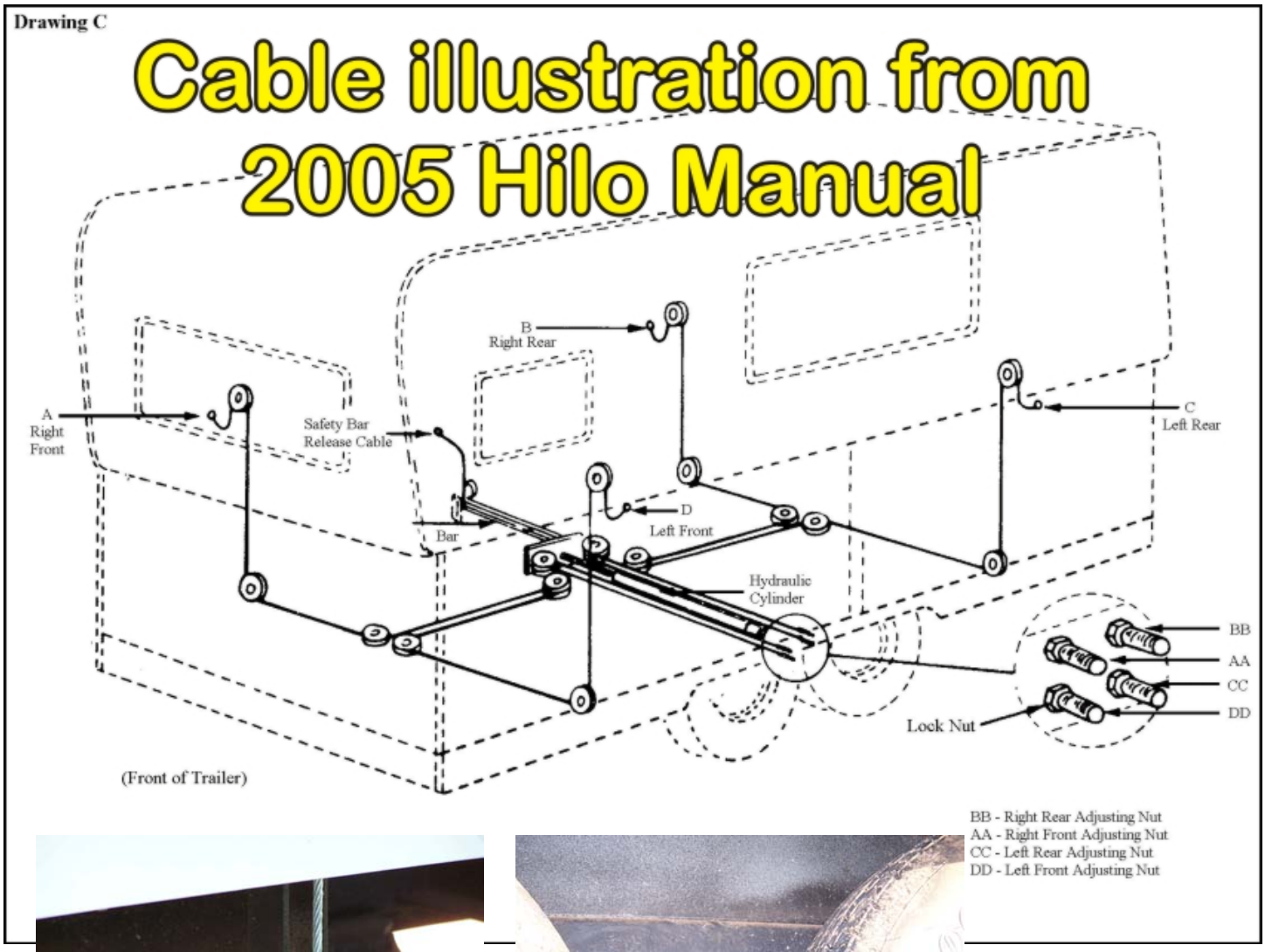
Here are some photos I took in the lifting stages and showing the jack stands lifting the entire trailer to give me more room to crawl around under the trailer. I used duct tape to hold the blocking in place until the trailer top was lowered on it. The weight of the top will keep it from falling after that:

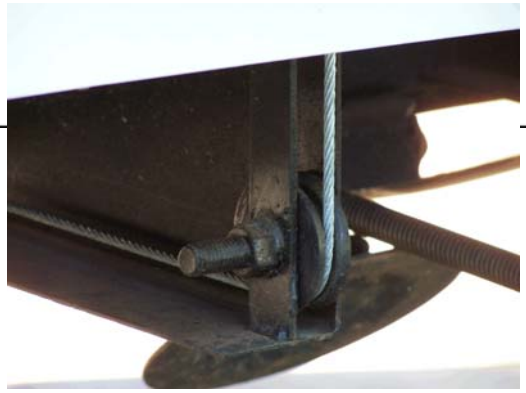
REMEMBER - Safety is the most important thing!!!

Work safe, work at your own pace, and if you are not sure about something ask for help from the group or a friend!

Now that we have the trailer up and blocked, it's time to start taking the bad cable(s) out. I also took my wheels off after I took these photos so I could crawl around and access the bolts on the lift cables easier. I also did some repair work to my wheel well (a "might as well" thing since I had the trailer up in the air). I had some surface rust on my wheel wells and I sanded the rust off, hit it with steel wool, sprayed with rusty metal primer and galvanized metal loaded paint and then several coats of black rubber auto undercoating material. I should never have to worry about the wheel wells again. One had rust, but I did both of them so I would not have to do the other later. Sorry, but I did not take photos of this part of the project.

Here is the cable illustration straight from the 2005 Hilo Manual (thanks Larry!). You will need a good understanding of how the cables are run to undertake this project. Look at the photo and then look at your actual trailer and it should make sense. Here are a few photo's of my actual pulleys and the adjustment bolts also.





Lift pulley where cable goes into trailer wall to upper pulley

My adjustment & jamb nuts in frame

It’s time to take the old or broken cables out. I decided to replace all of mine so they would be the same age (as in I did not want to do this again in 6 months). The extra cost was not bad, $120 for the set of 4 versus $30 for a single cable. So let’s get started:

- Take the jamb nut and adjustment nuts off the threaded rods in your wheel well.

- Take the bolt out of the other end of the cable. These bolts are under the bottom edge of the top half of the trailer.

- Next I cut the swaged end off so I could pull the cable back through the pulley system (this is the end at the bolt in the top half). The swage and thimble (the round piece of aluminum the bolt goes through) will not fit through the pulleys.

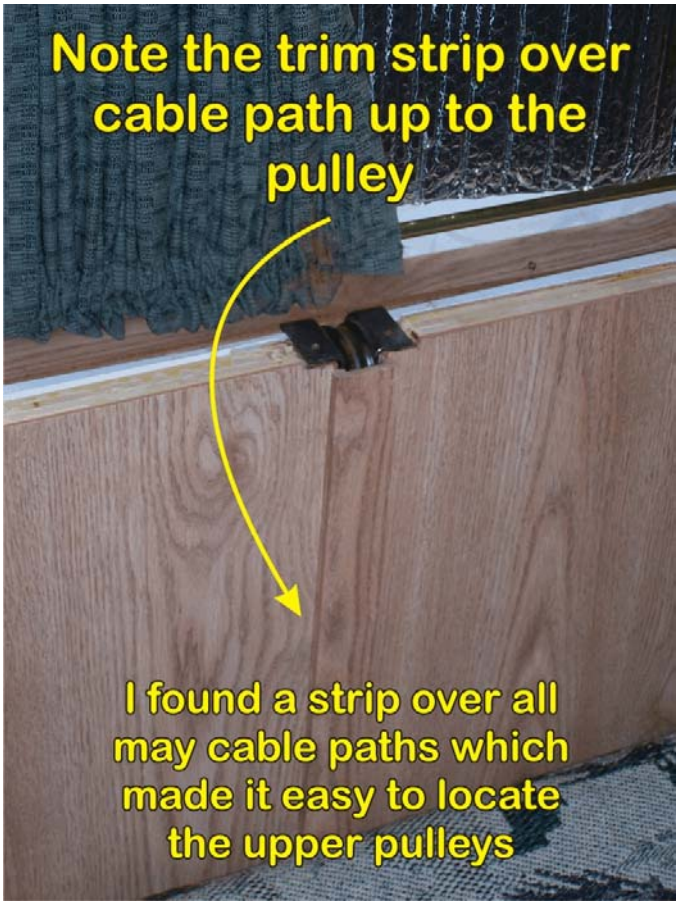
- Here is why I had to replace my cables - they had rusted and the metal had failed under the weight of the top half while lifting. ***This is why everyone should lubricate and protect their cables yearly with either WD40, BreakFree CLP or a similar product*** I was the 2nd owner and have no idea if the cables were ever lubricated/protected before. The damage would indicate they were not. I only had the trailer a few months before I noticed the rusting, and it broke later. All but one of the cables were rusted. I had a 2nd cable break as we were doing the blocking process. Oddly enough the cable by the door looked like it was brand new.

- All the rusting on my cables was where the cable sits on the top pulley with the top half up. Larry Mills at Hilo told me that under certain conditions, if the top is left up for long periods of time, moisture tends to condense at this point. What I found supports his statement. REMEMBER - LUBE & PROTECT YOUR CABLES YEARLY!!!! (unless you actually like replacing them). Broken cables are usually due to faulty maintenance, not faulty cables.

This is the one that broke first! Rust weakened the strands of steel cable to the point of failure.

Another rusty cable - not yet broken.

Note the rust where the cable sits on the upper pulley



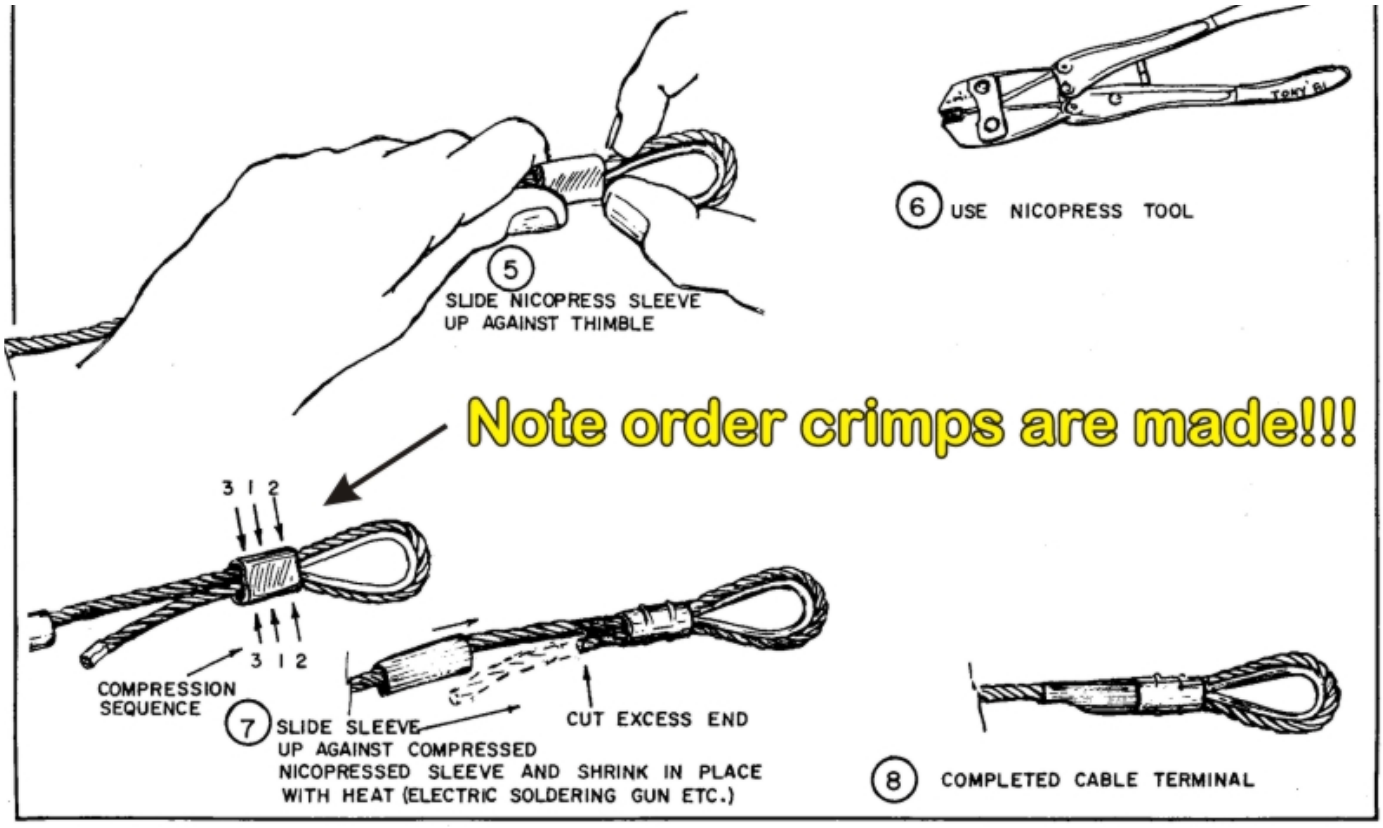
- Now that you have your old cable(s) out, it's time to make up the new ones. The replacement cables I bought already had the threaded rod swaged on one end and the cable was bare on the other. Here are some photos I took of my new cables. The gold nut on the threaded rod is the adjustment nut, and the silver nut is the jamb nut that locks the adjustment nut in position after installation.

On the following page you will find the instructions on how to use the swaging tool to swage the aluminum sleeve on the cable after looping it around the thimble. You will have to cut the cable to length before swaging. Be very careful!! Once you cut it, if it's too short the cable is useless, so measure twice.

I took the nuts off my new cable and then inserted the threaded rod through the trailer frame into the appropriate adjustment hole (pay attention to which cable goes in which hole). I then routed each cable across the pulleys and up and out to the attachment point. My cables were plenty long. I then put one nut on just the tip of the threaded rod. Then pulling with all my weight, I tired to get as much slack out of the cable as possible before marking where the thimble should be swaged. It is actually impossible to "pull" all the slack out of these steel cables so after the 1st one, I moved my thimble mark in a slight bit. But again, you will still have to get the rod and nut started to take up the slack so don't make them too short. This part makes more sense when you are actually

looking at the rod, cable, nuts and thimble in place. My first cable ended up being a tad bit longer than the other three so I now have a tad bit less threaded rod to use for slack removal later. Live and learn by trail and error.

One thing to remember is there is a certain order you will need to make the three swage crimps on the sleeve to lock the cable in place in the sleeve. This gives the maximum grip on the cable to prevent slippage.



Then reinstall the bolt through the thimble in the new cable and tighten the bolt into the hole in the bottom edge of the top half of the trailer. Now just repeat this process for every cable you are replacing. After the first one, you will find the others go pretty easy.

I also sprayed my new cables with BreakFree CLP before installing them. This stuff will dry and form a protective and lubricating film on the cable strands. I did mine before installing as I knew I could get the entire cable now and parts would be hidden inside the trailer walls later.

Since we are crawling around under the trailer, this would also be a good time to inspect and grease the guide rod for the lift cylinder. Here are some photos from the 2005 Hilo manual to show you what I'm talking about. These photos are of a new Hilo on the factory floor and the grease is nice and white and easy to see. Also look at your guide block (the metal plate the guide rod goes through). It should have tapered edges and not square edges. If you have the square edge model, I would call Hilo and ask them for advise as there was a warranty fix on this issue some time back (not many had the square edges however). Your guide rod should be straight and not bent or curved. It should not look like it is binding on the guide block when the lift cylinder is extended.

To the right is a photo of the lift cylinder. The guide block is at the very lower left corner of this photo (you can see the white grease on the guide rod where it goes through the hole in the guide block). This lift cylinder is "down" or all the way in. As the cylinder extends, it pushes on a plate where the first pulley for the cables is located, this in turn pulls against the end of the cable attached to the top half as the other end is anchored to the trailer frame. This is where the lifting of your top half of your trailer takes place. It's not as complex as it sounds and is actually based on a centuries old technology of "block and tackle" lifting. We just use an electric hydraulic pump to do the heavy lifting.

Now all we have to do is use the floor jacks to take the weight off the 4x4 blocking one at a time and lower each corner so the cable are holding the top half up. Then it's just a matter of taking the slack out of the cables and adjusting the lift height and you are done.

Unfortunately I did not take photos of the slack removal and height adjustment process so I will just have to text you through it.

Here are the directions "cut and paste" from the 2005 Hilo manual:

Check the leveling adjustment points for simple front and back realignment, adjust the proper adjusting nut located on the underside of the trailer. All front to back adjustments should be made with the trailer upper section supported so that tension is removed from the cables accomplished by lowering the upper section onto four 2"x4" boards of the same length to brace between the section and frame member.

For example, if the front section is lower than the rear, you will correct this condition as follows:

A. Lower the top section onto 2"x4" boards. Refer to Fig. 4
B. Loosen the locking nut.
C. Turn the front adjusting nut until all slack in cable is taken up.
D. Tighten the locking nut.
E. Raise trailer; remove 2X4 boards and check for proper alignment.

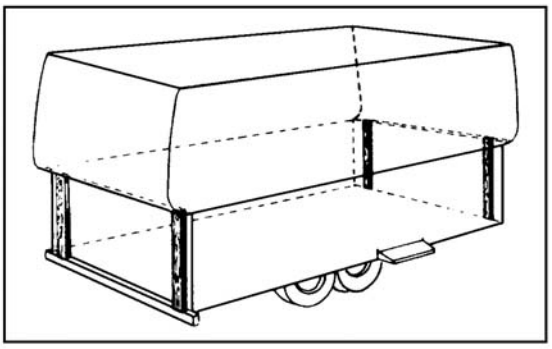


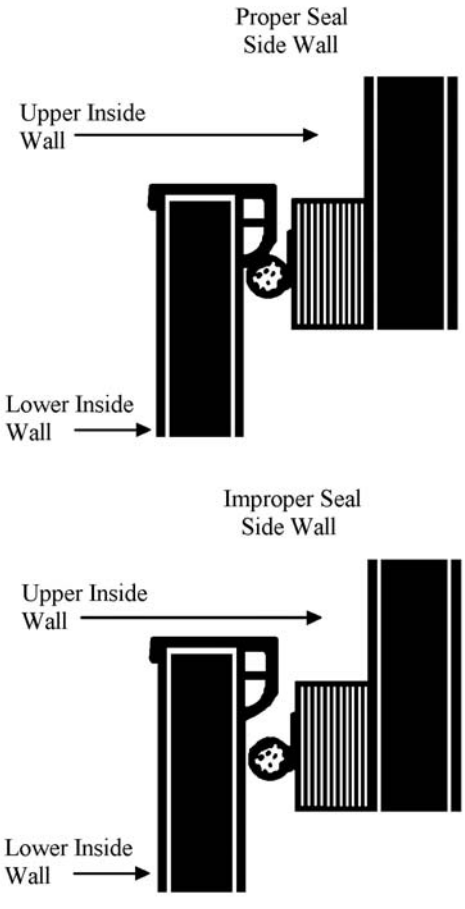
Figure 4

If one corner of the trailer is low, it may be corrected as follows:

A. Lower the top section onto the 2"x4" boards.
B. Loosen the locking nut on the appropriate cable.
C. Adjust nut to take up slack in cable,
D. Tighten locking nut on cable.
E. Raise trailer; remove 2"x4` boards, and check for proper alignment.

Ok, here is the way I did it.

First we need to get as much slack out of the cable as possible. There are two ways to do this. The first is to run the top up and down a few dozen times and the pressure and slack will even out more each time. The easy way is run it up and down a time or two, then when you lower it leave it 1" to 2" above the frame rails. That's right, don't lower it all the way so the top half is hanging by the cables instead of resting on the frame rails and outriggers (depends on the length of your trailer as to if you have outriggers or not). Then hook up to your tow vehicle and *SLOWLY* (and I mean very slowly) drive around a quiet block or two. The idea is to let the gentle jostling of the road and gravity put tension on the cables and take all the slack out.



Next you want to get the cables adjusted so the top half is in the proper position while up (see illustration to the right). I measured how much each area at the pulleys was above or below where I wanted it inside the trailer with the top up and wrote this down. Then I lowered the top half onto a 4x4's laying sideways across the frame rails in either the front or back (do one at a time, front or back). The weight of the other end of the top half will compress the cylinder and take the slack off the cables at the end

with the 4x4. Then just crank in or out on the nuts the amount you measured for each cable that needs adjustment. Raise the top up enough to take the 4x4 out and then do the other end of the trailer if needed.

Yes it sounds odd to go to all that trouble to take the slack out of the cables and then put some back in by using the 4x4 method for adjustment. But you want the cables taught before taking your adjustment measurements. Now run it up and check the top half to make sure it is aligning with the bottom half trim inside the trailer as in the illustrations on the previous page. If so, just lower the top half and leave it 2" above the frame rails and drive around the block one last time. Then you are done.

I have not had to adjust the slack in my cables since I did this several years ago. Charlie Cockerel at Hilo was the one who suggested I try the board across the frame rails method, and it works great! I think that was the last time I spoke to Charlie before he retired.

I'm typing this from memory and it has been a few years since I changed out my cables. I hope I made this easier for you to understand and I don't think I left anything out. But if you are not sure, ask in the yahoogroup for Hilo owners, or just call J&R Trailer Repair and Hilo and ask them. They are some of the friendliest people you could ever talk to and it has been my experience they will bend over backwards to make your trailer ownership as enjoyable as possible (even if you want to tackle the work yourself).

David Ward
Moderator
Hilo owner group - Yahoogroups

PS - This is just a documentation of the way I fixed my cables. I'm not a trailer or Hilo repair person and am just a "layman". So I don't guarantee what I have said is the best way, the recommended way, or the safest way to change out your cables. Any do it yourself project of this type can have inherent dangers (come on, it's a 2 ton trailer and we are taking the cables "out" with it up! Yes, it can be dangerous). So anyone who decides to use this document as a guide, assumes all responsibility for their personal safety and actions. Look, what I'm trying to say here is, this is what I did, but if you decide to try it, you do so at your own risk (so there, now my lawyer is happy).

SWAGING TOOLS
USE AND ADJUSTMENT INSTRUCTIONS
FOR
82632-HAND AND S2632-BENCH

Our line of "New Generation" swaging tools have been designed to compress Aluminum and Copper Oval and stop sleeves onto mechanical cables in the sizes of 1/16", 3/32", 1/8, 5/32" and 3/16". A description of the two models is as follows:

MODEL # DESCRIPTION

S2632-H Hand held tool. The length of the handles assures ease of operation, and the unique box joint at the pivot point of the swaging jaw keeps the swaging surfaces in line with each other.

S2632-B Bench mounted tool. This tool utilizes the, same swaging head as the hand model above. The toggle action assures ease of operation, leaving one hand free to manipulate the cable.

CABLE, SLEEVE, TOOL/GAUGE CAVITY SELECTION CHART

Aluminium / Copper Oval Sleeves		Cable & Sleeve Size	Aluminium / Copper Stop Sleeves	
Groove & Gauge Cavity	Number of Crimps		Groove & Gauge Cavity	Number of Crimps
2	1	1/16”	2	1 overlapped
3	3	3/32”	3	2 overlapped
4	3	1/8”	3	2 overlapped
5	3	5/32”	4	2 overlapped
6	4	3/16”	4	2 overlapped

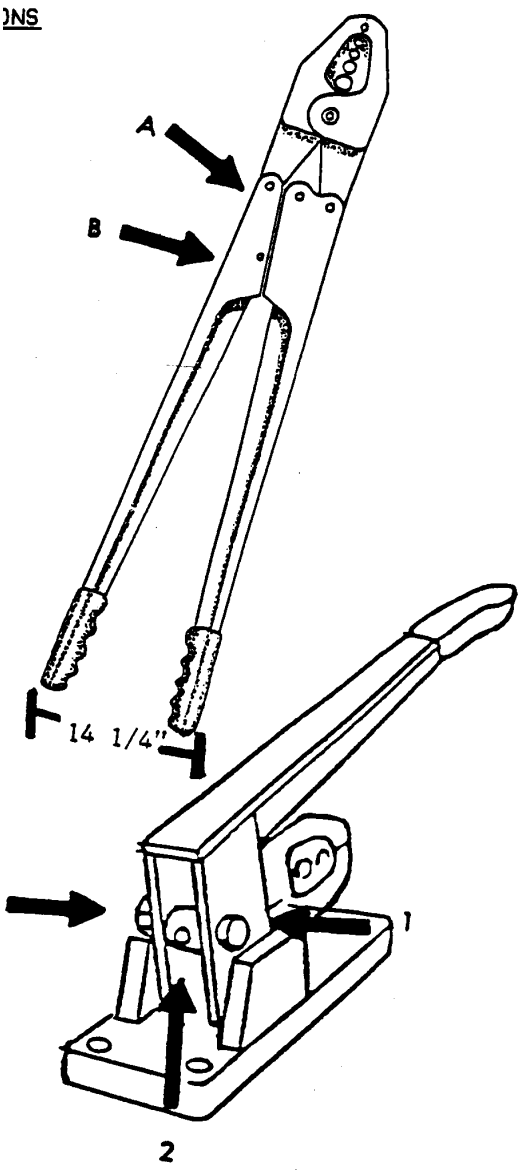
IMPORTANT NOTE

FITTINGS PRESSED OR SWAGED OVER ANY PLASTIC JACKET WILL NOT HOLD TO THE NOMINAL PUBL

ADJUSTMENT INSTRUCTIONS

Model S2632H (Hand Tool): Screw A sets the preload and is the primary pressure adjustment. Screw B is a locking screw and must be loosened before Screw A can be turned.

To adjust: Turn Screw B counter-clockwise to loosen. Two or three turns will usually free the adjusting bar. Turn Screw A clockwise to increase pressure. A good starting point for checking the proper pressure on the tool is by measuring the handle spacing (14 1/4"). Measure the distance indicated from the outside bottom edges of the grips when the end of the tool at cavity #2 is touching but not closed (not under tension). Retighten Screw B to lock at the desired pressure.



Model S2632B (Bench Tool): Raise handle to relieve pressure on the jaws. Loosen Locking Nut (1). Insert a pin or the tip of an Allen Wrench in the hole on the Cam (2). Loosen Screw (3). Raising the pin in the Cam (2) will increase pressure on the jaws. A starting point for proper adjustment is to measure the height of the handle tip from the bench top. When the end of the jaws at cavity #2 are touching but the handle is not closed under tension, the measurement should be 8 5/8" to 9 1/8". After proper cam position is found, tighten Screw (3) while holding Cam (2) in position. Then
tighten Lock Nut (1).

HANDLES ARE UNDER TENSION - GRIP FIRMLY WHEN OPENING.

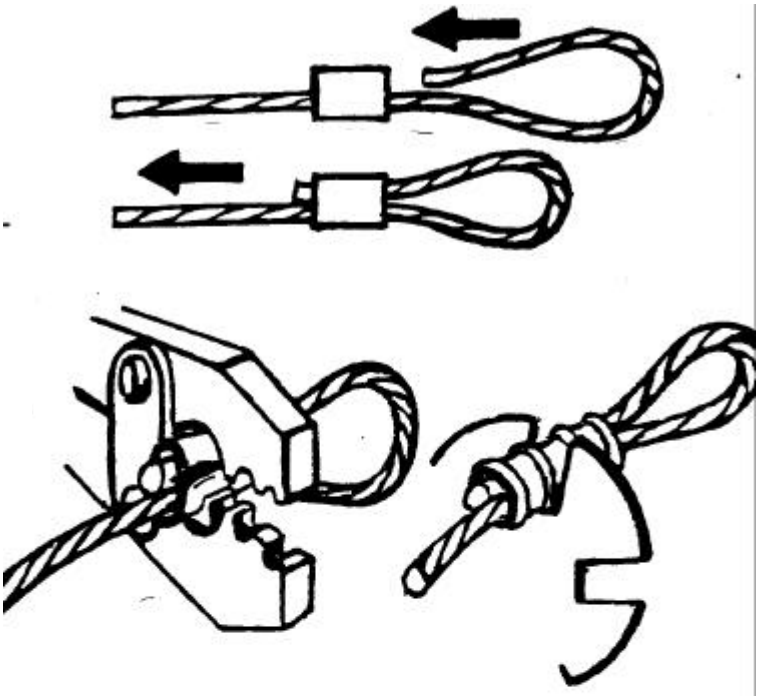
NOTE: For long life and ease of operation, these swaging tools must be kept well lubricated, maintained and in proper adjustment. For lubricating purposes, a light motor oil is satisfactory.

WARNING: The holding power of sleeves is influenced by the diameter of the wire rope as well as construction. Exact strength tests should always be performed on a sample of the wire rope to be used when exact holding power must be determined. As in all wire rope applications, proper design factor must be employed: design factor is the ratio of strength of assembly to the applied load.

MAKING A COMPRESSION SLEEVE SPLICE

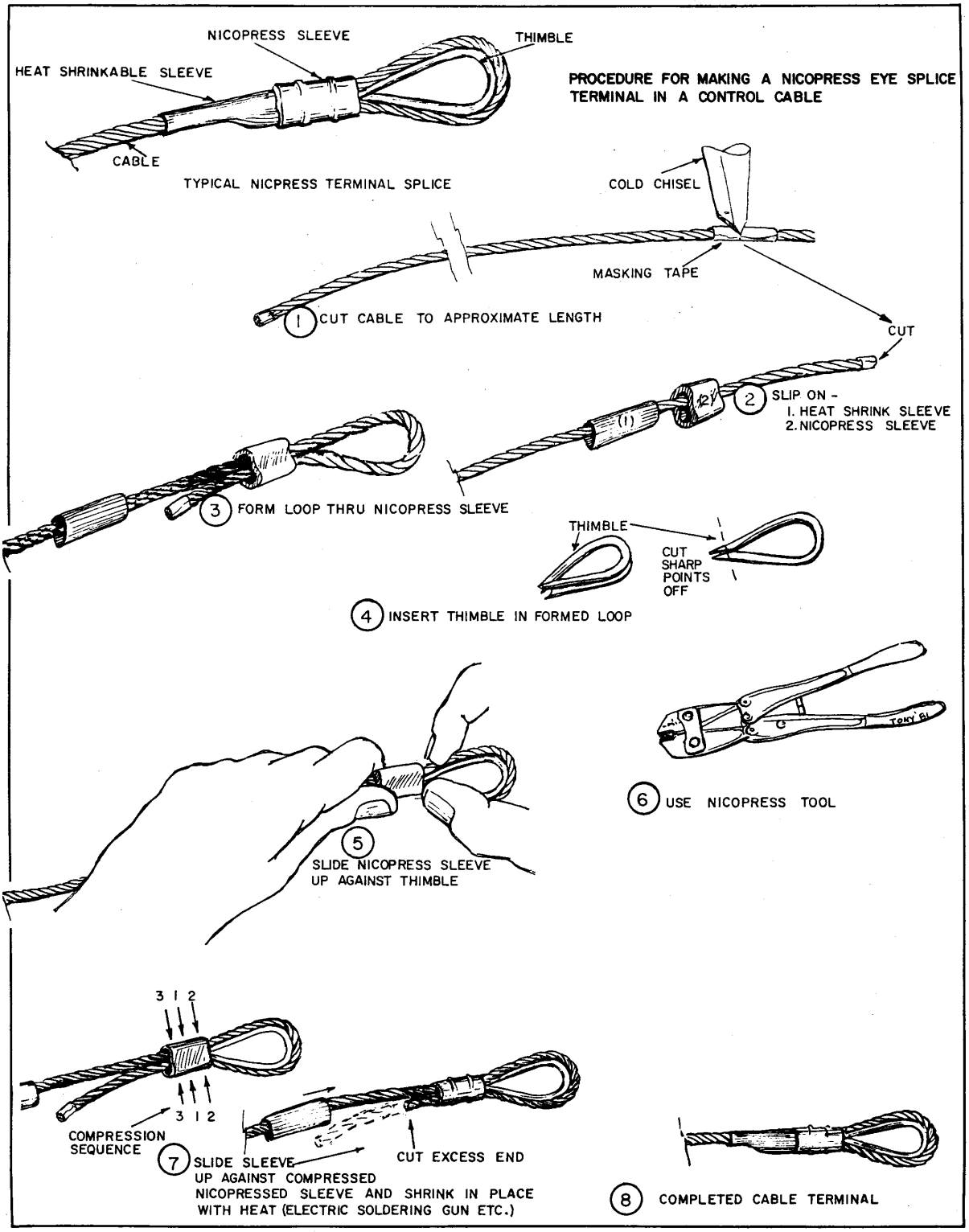
Compression Sleeves are usually used in three types of splices: Loop, Lap or Stop Sleeve (see below). After determining which nominal diameter wire rope you wish to splice and the type of splice you wish to make, select the Oval or Stop Sleeves of the same nominal size. Then, by referring to the Chart on page (1) note which tool, tool groove/gauge cavity you should use and the number of crimps which should be taken. Proceed as follows:

LOOPS: Insert cable through the sleeve and rethread back to form loop to size desired. It is usually easier to form a larger loop at first and then to pull back on the longer end of the cable until the proper loop size is obtained. Leave about 1/8" of cable extending outside of the sleeve after threading, and make sure this does not slip back into the sleeve when “pulling up”. Using the correct groove #, take the required number of crimps along the sleeve. Do not start on the very edge of the sleeve. Sleeve ends should project beyond the tool jaws slightly. After each crimp, rotate the sleeve 180°. This will help prevent the sleeve from becoming "banana" shaped. Gauge the sleeve after compression. If the gauge does not slip freely onto the crimp portion, the tool should be adjusted. See "Adjustment Instructions".



LAP SPLICE: After threading the two lengths of cable into the Oval Sleeve, crimping instructions are basically the same as loops. Note, a minumum of two sleeves are recommended and proper tests should be made to determine actual strength of the splice. Leave the usual 1/8" of cable protruding from the sleeve and allow a space of at least two cable diameters between the sleeves. Gauge as usual.

STOP SLEEVE: Thread cable through sleeve until a full 1/8" of cable is protruding from the stop. Crimp the sleeve the recommended number of times in the groove , indicated in the chart. Stop Sleeves will not hold for the break strength of the cable. Proof testing is recommended for specific applications. Gauge as usual.


NICOPRESS SLEEVE
THIMBLE
HEAT SHRINKABLE SLEEVE
CABLE
TYPICAL NICPRESS TERMINAL SPLICE
PROCEDURE FOR MAKING A NICOPRESS EYE SPLICE TERMINAL IN A CONTROL CABLE
COLD CHISEL
MASKING TAPE
1 CUT CABLE TO APPROXIMATE LENGTH
CUT
2 SLIP ON -
1. HEAT SHRINK SLEEVE
2. NICOPRESS SLEEVE
3 FORM LOOP THRU NICOPRESS SLEEVE
THIMBLE
CUT SHARP POINTS OFF
4 INSERT THIMBLE IN FORMED LOOP
5 SLIDE NICOPRESS SLEEVE UP AGAINST THIMBLE
6 USE NICOPRESS TOOL
3 1 2
3 1 2
COMPRESSION SEQUENCE
7 SLIDE SLEEVE UP AGAINST COMPRESSED NICOPRESSED SLEEVE AND SHRINK IN PLACE WITH HEAT (ELECTRIC SOLDERING GUN ETC.)
CUT EXCESS END
8 COMPLETED CABLE TERMINAL