# Inspection and Repair Manual for Tri-Level Hinge Decks


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TrinityRail®
4084 Sandshell Drive
Fort Worth, Texas 76137

Telephone: (800) 336-7305
Fax: (817) 378-2043
E-mail: trinitypartssales@trin.net

# Table of Contents

# Table of Figures

## Explanation of Caution and Warning Headings

The headings shown below are used to alert you to possible or even probable threats to your safety or health if you are not aware and cautious. As these paragraphs appear in the text read them carefully and follow their instructions completely.

| DANGER |
| --- |
| Danger is indicated when operator death or injury is probable if the message is ignored. |

| WARNING |
| --- |
| A Warning is indicated where operator death or injury is highly likely or damage to equipment is probable if the message is ignored. |

| CAUTION |
| --- |
| A Caution is indicated where operator injury is possible or damage to the equipment is likely if the message is ignored. |

| NOTICE |
| --- |
| A Notice is indicated where information is important to the operation of the equipment or to the operator's understanding. |

| NOTE |
| --- |
| A Note indicates information that may be useful to the operator but does not involve issues of safety or health. |

## Safety First

Always use Extreme Care when working on any autorack. This manual is intended for use by those who are familiar with autorack repair and sound railroad safety procedures.

| WARNING |
| --- |
| The Hinged B Deck is a very large and heavy assembly. |

| WARNING |
| --- |
| Safety stands must be placed under the deck whenever the hinges, deck seats or deck locks are being worked on. |

| WARNING |
| --- |
| The springs are under tremendous tension at all times. Extreme caution should always be used whenever these springs are disconnected, connected, or adjusted. |

If there is any question about safety, **STOP!** Contact your supervisor or *TrinityRail* Products Engineering.

Whenever an autorack is removed from service for any reason, the hinge deck should be inspected for wear and operation. The goal of each repair facility should be to put a rack back into service, so that it will operate maintenance-free until the next scheduled certification. Proper repairs using quality parts should allow each facility to reach its goal of eliminating down time.

## Introduction

This manual has been developed to aid in the proper Inspection and Repair for all Thrall Car and Whitehead and Kales (W&K) hinge decks. Please review the entire manual before proceeding with any repairs.

A properly adjusted hinge deck can be operated by one normal-sized person. The deck should also sit down tight on all the deck supports (including cones) when it is in the locked down position. There is therefore no free play or bounce in the deck when locked down.

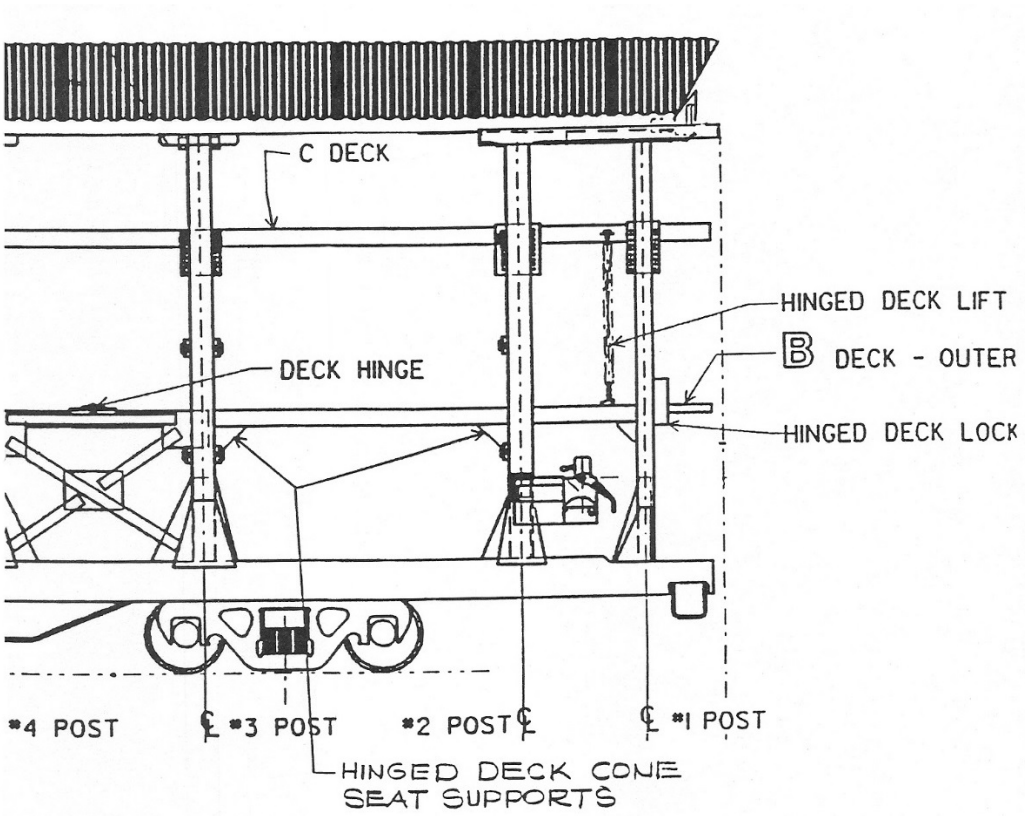
These decks are designed to last the life of the autoracks. Under normal use, these decks should operate from certification to certification with little or no need for anything more than minor adjustments and periodic lubrication.

The Suggested Repair Procedures outlined in this manual were developed to reach and maintain our goal of continuous service between certifications. Prep Track and Loading Ramp personnel must perform inspections and make the necessary minor running repairs as well as the periodic lubrications. Pool Repair Shops and Certification Shops must also perform inspections and thoroughly repair autoracks in their programs.

With this team effort, the number of autoracks removed from service for "Bad Ordered" hinge decks can be eliminated. If minor repairs are found and fixed on a timely basis, major repairs will be avoided. Proper inspections and repairs will reduce the number of autoracks out of service and overall will reduce costs.

Please contact Trinity Parts and Components with any questions on these procedures or for information on other autorack repair procedures. Call Trinity Parts and Components, LLC, at (800) 336-7305, fax (817) 378-2003; www.trinityrail.com/parts.

| NOTICE |
| --- |
| The operations detailed in this manual must be performed in shop facilities that are approved by the Association of American Railroads [AAR] and by mechanics trained by Trinity North American Freight Car, Inc. [*TrinityRail*]. Please contact *TrinityRail* Customer Service department at (800) 227-8844 to request training and / or the latest version of the procedures. |



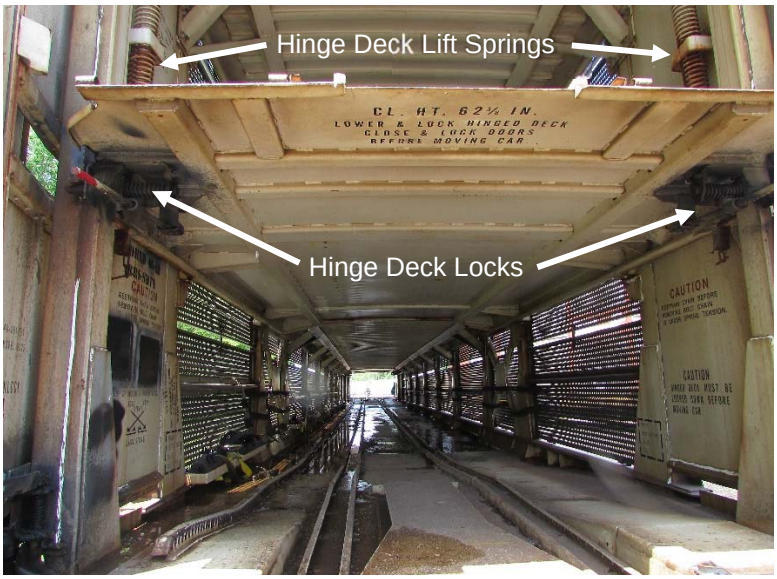




**Figure 1. Tri-Level Autorack Hinge Deck**

## Notice to All Autorack Certification Shops:

When certifying Tri-level autoracks built by Thrall Car, the following hinge deck inspections and adjustments should be made:

| WARNING |
| --- |
| Always use caution when working on these deck lifts. All springs are under a tremendous amount of tension. |

1. Check the hinge deck lift adjustment. All Thrall hinge decks should "float" half way between the locked up position and the locked down position. Adjust the lift mechanism to achieve this float.
2. All Thrall Car Tri-Levels built since June of 1986 have the new style heavy duty deck lock pins. These pins have the tapered ends. The following lube procedure should be followed: (See Figure 2).
   - Apply dry lube (AAR approved) to the lock receiver plate and to the tapered ends of the lock pin. (No grease!)
   - Apply a small amount of AAR approved grease to the grease fitting on the lock assembly bearing pipe.
3. When certifying Tri-levels built by Thrall Car Winder from June 1986 to August 1987, the following additional hinge deck lock modification is recommended. (See Figure 2)
   - Remove the 2 bolts from the deck lock backing plate
   - Move the backing plate to the other side of the lock plate.
   - Reapply the 2 bolts.
4. This lock modification has already been completed on racks built since 8/87.
5. The modification to the hinge deck lock will increase the spring pressure on the deck lock pin. This will help to insure the pin will not become unlocked. No new parts are required for this operation.

Please contact Trinity Parts and Components with any questions concerning this notice or for information on other autorack repair procedures. Call Trinity Parts and Components, LLC, at (800) 336-7305, fax (817) 378-2003; www.trinityrail.com/parts

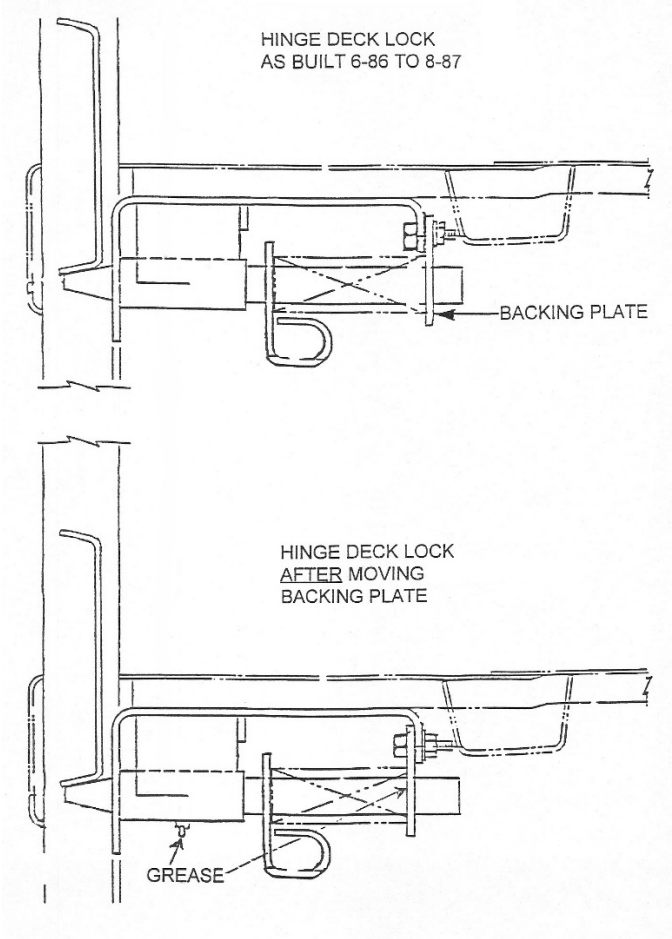



**Figure 2. Hinge Deck Lock Modification**

# Hinge Deck Inspections

## Hinge Deck Lift Inspection

1. All hinge deck lifts, when properly adjusted should allow one person to operate a hinge deck by themselves with reasonable effort. However in normal prep track operation, this is a two person operation (one on each side of deck).
2. When the deck lift is properly adjusted the deck should "float" half way between the locked-up position and the locked-down position. If not, the lift system must be adjusted.
3. When each deck lock pin is pulled out (disengaged), the deck should move up far enough so the lock pin stays disengaged. This feature is important for a one man operation since one person cannot pull both locks at the same time.
4. Inspect all springs and attachment parts. If any parts are worn, bent or distorted they must be replaced.
5. An eccentric pulley is used on W&K style deck lifts. Inspect the eccentric pulley assembly on each edge of the C deck. It should be parallel between the shear panel plate and the edge of deck.
6. Watch the eccentric pulley as the deck is operated. The chain must feed straight onto the pulley, with no twisting of the chain.
7. The pulley must rotate freely around the pulley pin. If the pin is rotating; the assembly must be removed and repaired.

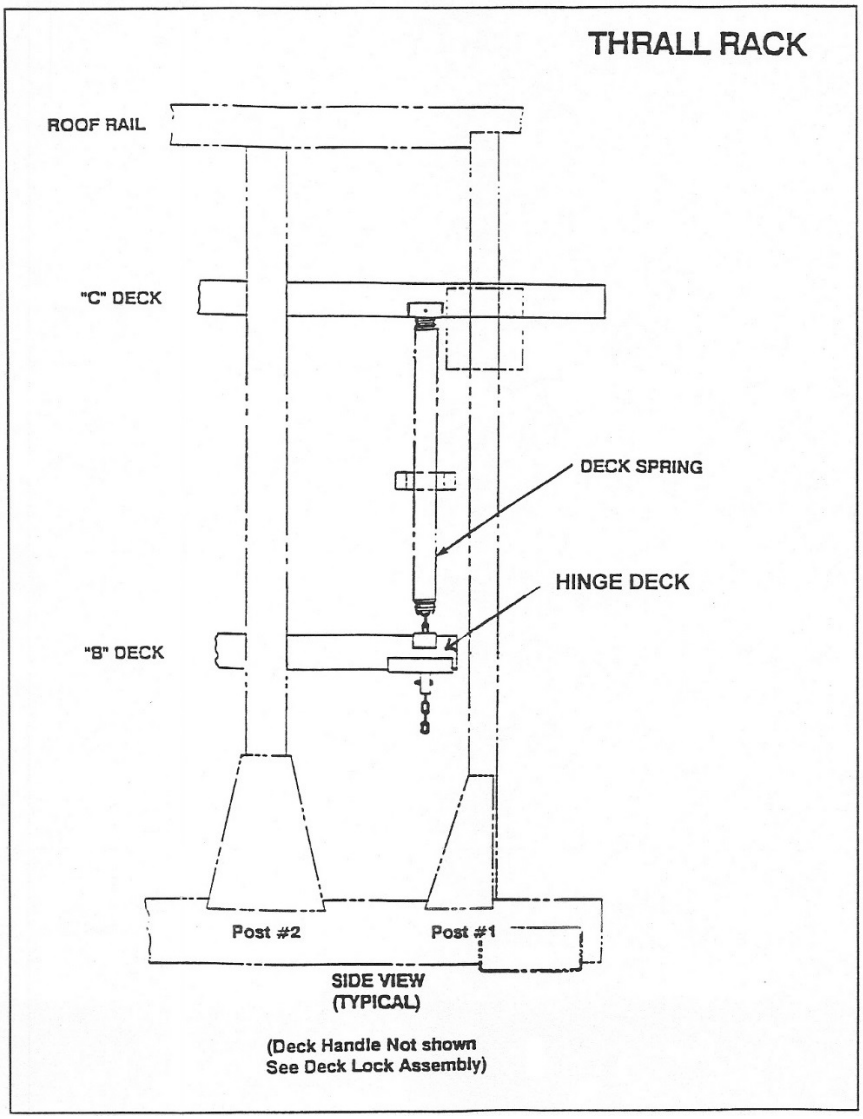



**Figure 3. Thrall Deck Lift Mechanism**

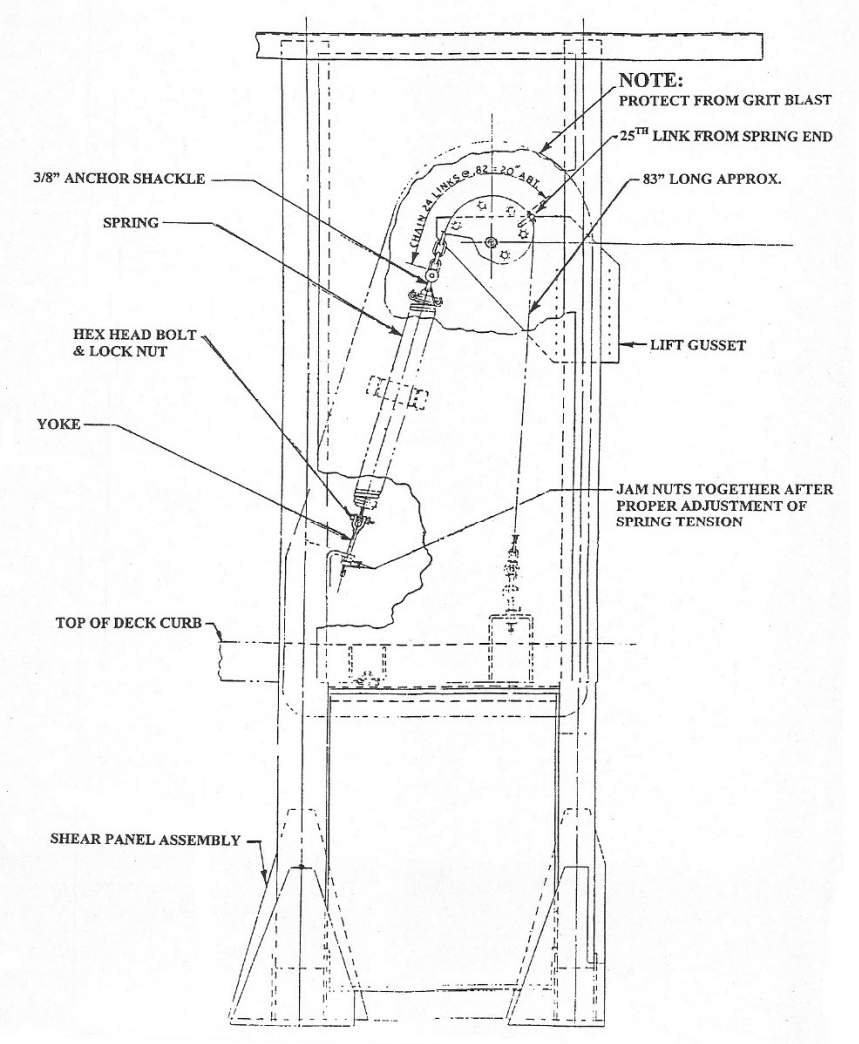



**Figure 4. W&K Deck Lift Mechanism**

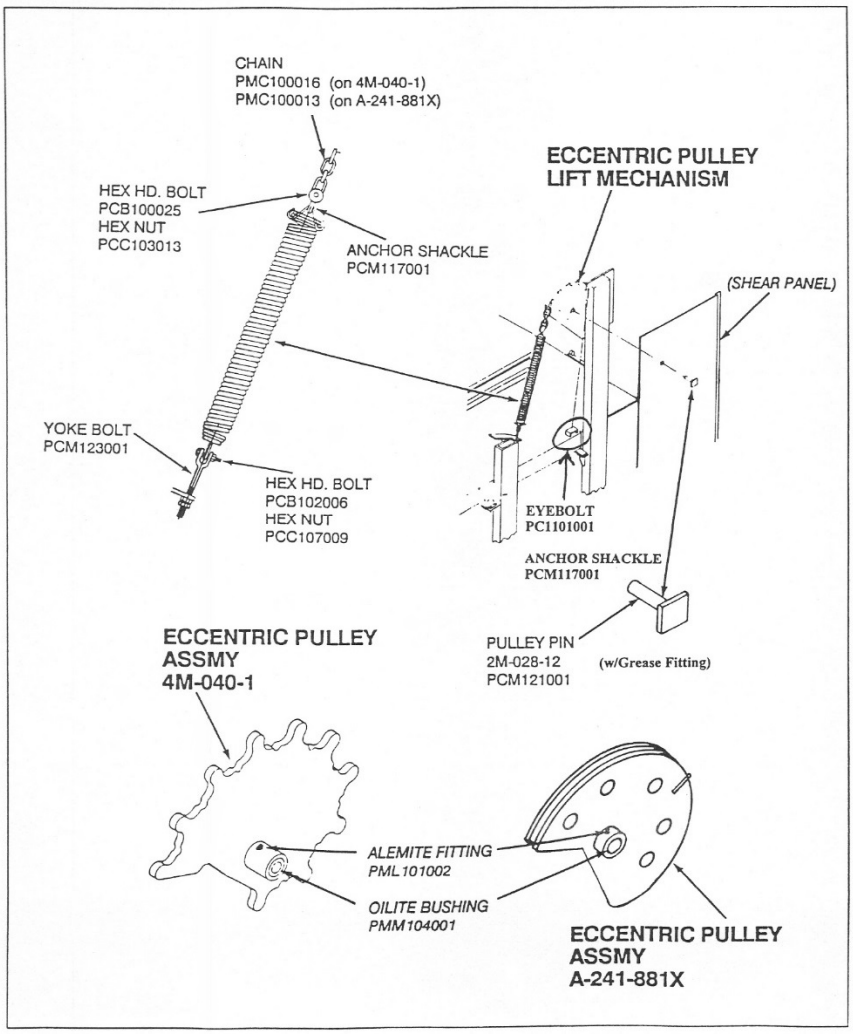



**Figure 5. W&K Pulley Lift Mechanism**

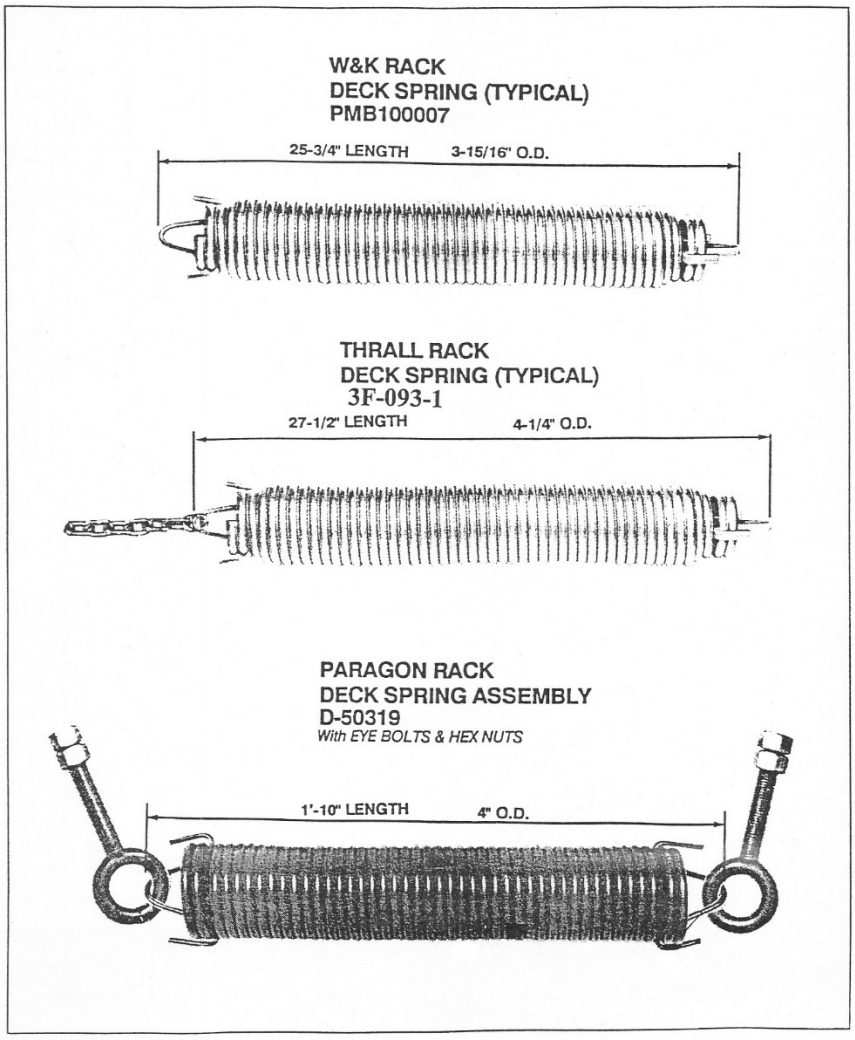



**Figure 6. Deck Spring Types**

## Hinge Deck Lock Inspection

1. Inspect all locks for missing or damaged parts. Replace as required.
2. Inspect all lock receivers for missing or damaged parts. Replace as required.
3. If the lock pin bushing or half bushing is worn more than $^1/_8$" on the W&K retainer assembly, replace it.
4. If the Thrall lock pin retainer is worn more than $^1/_8$", replace it.
5. If the lock pins show more than $^1/_8$" of wear, replace them.
6. If there is more than an $^1/_8$" gap between the locking pin and the back plate which is bolted to the back end of the lock, the back plate and / or the pin should be replaced to reduce the gap dimensions to below $^1/_8$".
7. Inspect around the locks and retainers for cracks or broken welds. Replace broken parts. Remove and repair broken welds.
8. The W&K style lock pin should engage completely into the receiver.
9. The Thrall style lock pin should engage to the point there is no more than $^3/_4$" gag dimension. (See Figure 14.)
10. Whenever the lock or the deck supports are reset, the Thrall style lock should be reset for a $^3/_4$" gag to allow for future wear.

Is this supposed to be “gage”?

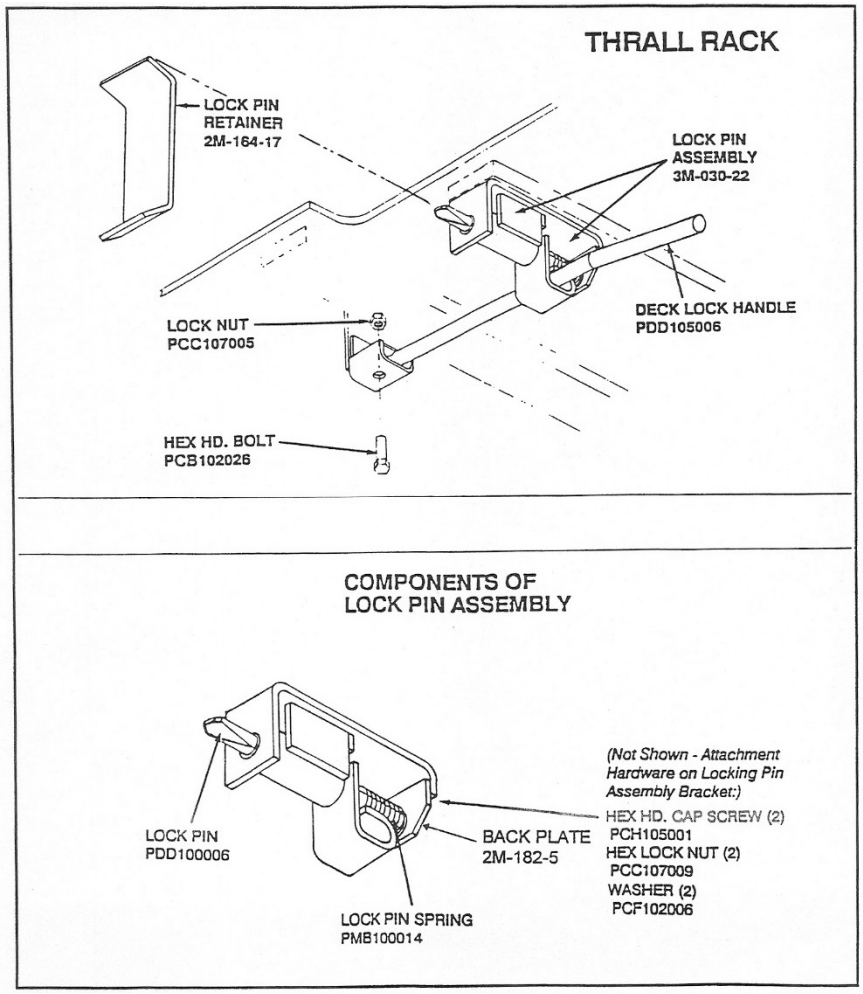



**Figure 7. Thrall Deck Lock Assembly**

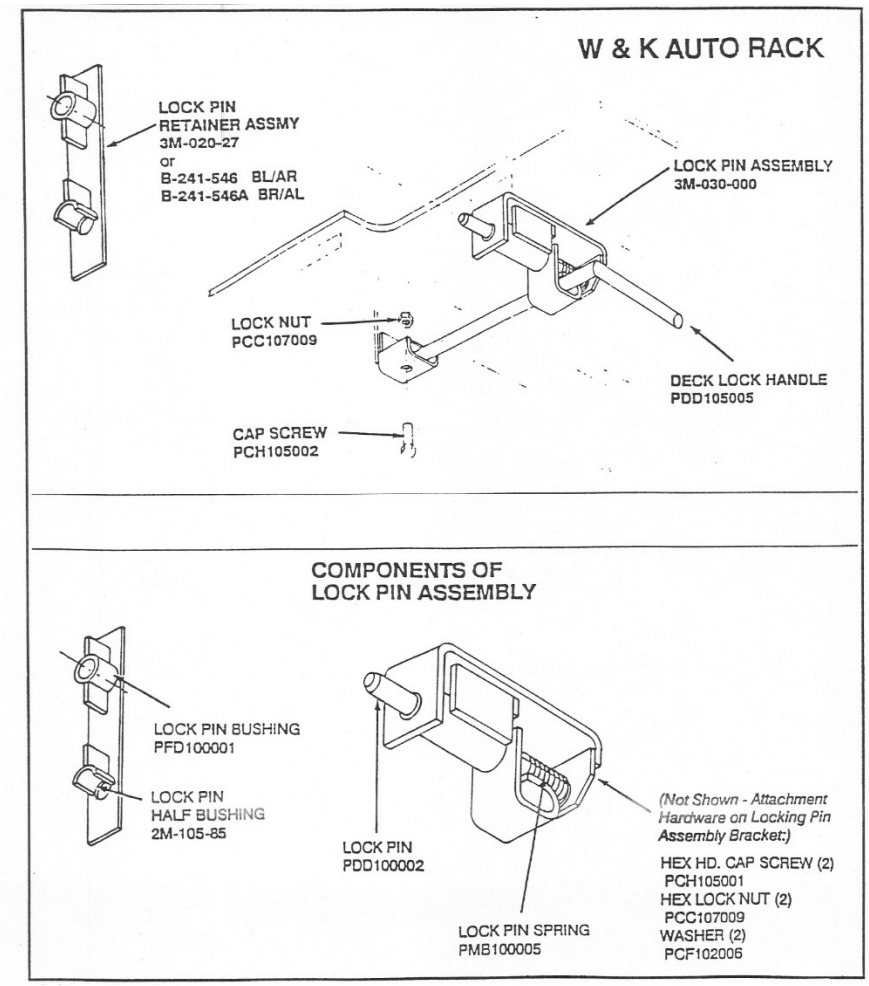



**Figure 8. W&K Deck Lock Assembly**

## Hinge Inspection

1. Inspect the hinge assembly attachment welds. If cracks are found, remove and replace the defective weld.
2. Replace the hinge pin if there is excess wear. More than 25% wear is excessive according to M-970-96.
3. There must be a washer welded to each end of the hinge pin. Replace as needed.
4. Inspect the hinge casting. Replace any cracked or broken parts.

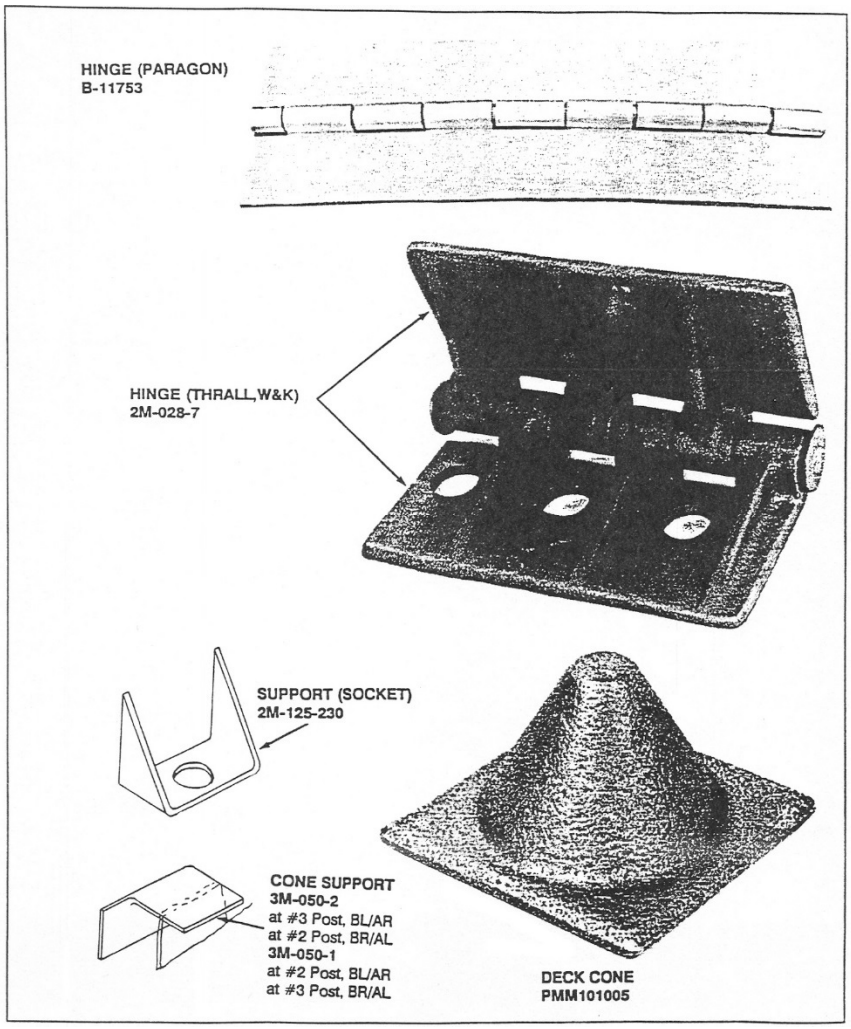



**Figure 9. Hinges Cone and Sockets**

## Cones and Supports Inspection

The hinge deck sits on 4 cones located at each #2 post and #3 post. The deck is also supported at the end on the deck seats located at each #1 post. If the deck is properly adjusted, it should contact all cones and seats at the same time. There should also be no up and down play in the deck when it is locked down.

1. Inspect the cones for wear. There is a top cone and a bottom cone at each location. If any cone appears to be worn more than $^{1}/_{8}$", it should be replaced. (A cone can be vertically cut in half and used as a checking fixture. Place the half cone over, or in, the existing cone and measure the gap between the two parts.)
2. Inspect the deck rests on the #1 post for wear. If they are worn more than $^{1}/_{8}$" (top or bottom), replace the worn part.
3. Inspect the cones and seats for proper vertical adjustment. As worn parts are replaced, there is often a need to re-shim other parts on the same deck. All cones and supports should carry weight and contact at the same time.
4. After the cones and supports are adjusted, there should be **NO** vertical free play in the deck when it is locked down. For this reason, the locks should always be reworked before the cones and supports are inspected or adjusted.

## Deck Structure Inspection

1. Inspect the entire hinge deck for cracked welds.
2. Inspect the hinge deck plate for cracks. Look very carefully between tie down troughs on the bottom side of the deck sheet. Also pay particular attention to the deck sheet near the hinge supports.
3. A deck which has been left in service with cones and seats out of adjustment for a period of time can develop cracks.
4. Inspect both ends of the longitudinal stiffener on the bottom side of the deck. There should be an operable drain hole in one or both ends of each stiffener.
5. Inspect to see if at least one lateral stiffener was applied between the tie down tracks on the top side of the hinge deck.

# Recommended Procedures

## Repairing or Adjusting the Thrall Car Type Deck Lift

| WARNING |
| --- |
| The deck lift springs are under tremendous tension. Care must be taken to avoid serious injury. If any parts appear worn, bent or distorted, they must be replaced. |

The deck will "float" half way between the locked up and locked down position when properly adjusted.

1. Put hinge deck in the locked up position.

| WARNING |
| --- |
| A safety stand must be placed at the outer end under the hinge deck to protect workers should the lock pins accidentally become disengaged. |

2. Apply one end of an industrial 2-ton come-along on the chain below the hinge deck. Use an industrial strength grab hook between the lift chain and the come-along. Do not hook the lift chain by the rod on the last length of chain. Secure the other end of the come-along to the floor or the ramp. Carefully pull down on the chain which hangs below the deck. Be sure that all securement points are sound.

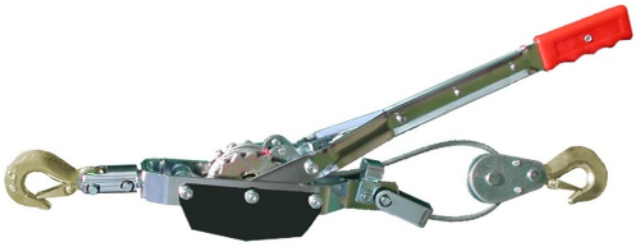


**Figure 10. Example Come-Along**

3. Remove the bolt which crosses through the chain square tube. If the bolt is worn, discard it. Replace the bolt with a Grade 8, $^{7}/_{16}$" bolt and lock nut.
4. Pull the chain downward to apply more tension.
5. Reapply a bolt through one of the 3 adjustment holes to obtain the desired amount of tension.
6. Relax and remove the come-along.
7. Remove the safety stands.
8. Operate the deck.
9. The deck must "float" half way between the locked up and locked down position. Repeat the process until the desired lift operation is obtained.
10. Apply a wire tie to the end of the chain and secure it to the chain link just below the square tube so the chain can't swing and damage the paint on the shear panel.

## Repairing W&K Hinge Deck Lift Mechanism

| WARNING |
| --- |
| Follow all procedures carefully to avoid serious injury. |

| CAUTION |
| --- |
| Safety first: Refer to drawing BSK-7076 shown in Figure 2. |

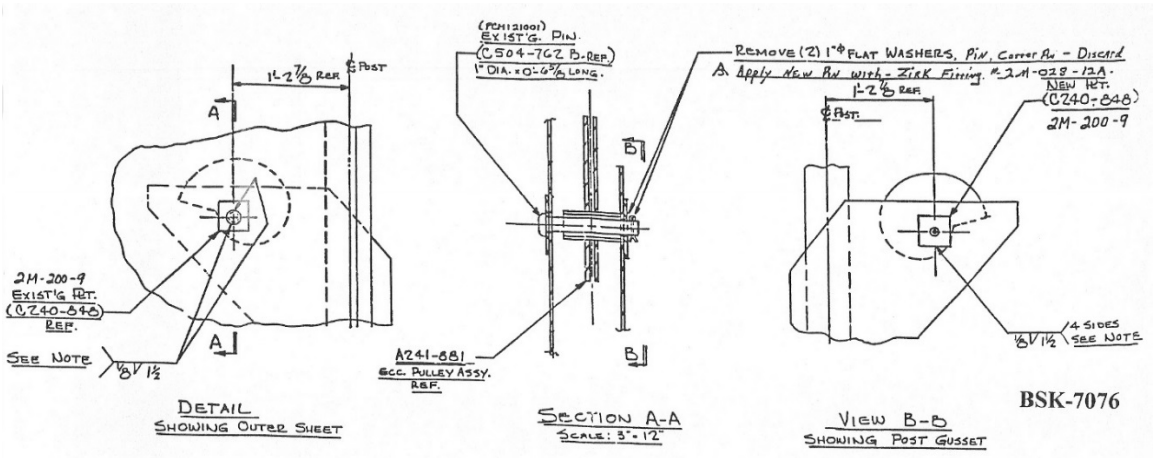
| NOTICE |
| --- |
| If the hinge deck lift mechanism (eccentric pulley) is "frozen solid" on the pin, the deck operation will be very difficult in both the up and down directions. |

1. Put the hinge deck in the up position. Put both lock pins in the upper receivers. A hoist, come-a-long, or jack may be required to lift the deck.
2. A safety stand must be placed under the outer end of the hinge deck to protect the workers should the lock pins accidentally become disengaged.
3. Remove the welds from each end of the pin which goes through the eccentric pulley. (Earliest models may not be welded.)
4. Hook one end of a 2-ton come-along to a clevis or chain near the deck connection. Hook the other end of a come-a-long to the side sill or similar solid structure under the B deck. This must be done before removing the nut from the eyebolt (PCl101001) or hex bolt (PCB100025) from the deck.

| WARNING |
| --- |
| The springs are under tremendous tension and could cause severe injury if care is not taken to slowly release the tension. |

5. Release the spring tension and then drive the pin out of the pulley.
6. Ream out the eccentric pulley bushing using a $1^{1}/_{16}$" reamer. The bushings can also be replaced if necessary.
7. Apply a new pin as shown in Figure 11.
8. Lubricate the pin and bushing with an AAR approved grease.
9. Reassemble the pulley with the new pin to the shear panel.
10. If the original pin was not welded, it will be necessary to put two new bearing plates (2M-200-9) on top of existing plates. Weld all four sides after making sure they are aligned to hold the pulley parallel to the shear panel plate. If the original pin was welded and the bearing plate holes were not worn, skip this step. This is done to adjust the pulley so it remains parallel between the shear panel and the deck curb.
11. If no grease fittings are provided in the cam, new pins should be applied which have grease fittings. (2M-028-12A)
12. Weld the pin on each end to the bearing plates or the shear panel and bracket.

13. Connect end of the chain to the hinge deck by reapplying the eyebolt. Replace the eyebolt if the threads are bad. Be sure the chain is not twisted and both nuts are locked tightly together.
14. Remove the safety stands.
15. Check deck lift adjustment by unlocking the deck locking pins. If the chains are adjusted properly, the deck should float half way between the upper and lower lock receiver holes. One man should be able to raise or lower the deck by himself. If further adjustment is needed, see section on W&K Hinge Deck Adjustment.




**REPAIR PROCEDURE**

1. **Check to see if there is any excessive wear of the bearing plates (where the cam anchor pin engages the inner and outer bearing plates).**
2. **If there is evidence of excessive wear at these points, the deck should be raised to the "up" position and locked in this position.**
3. **The deck spring should be disconnected to take the spring load off the eccentric pulley assembly.**
4. **The anchor pin (rivet) should be removed to see of there is any excessive wear to the anchor pin. If so, the pin should be replaced.**
5. **When re-assembling, discard the two 1" round flat washers. In their place, use new bearing plate #2M-200-9.**
6. **Align the pin for proper operation of the cam. Then weld the added 2M-200-9 bearing plate to the existing plate 1/8" weld 1-1/2" long all four sides of the plate.**

**Figure 11. Field Fix for Deck Lift Cam Support**

## Adjusting the W&K Deck Lift

The pulley assemblies must be functioning properly before adjusting the spring tension. See Repairing W&K Hinge Deck Lift Mechanism in previous section.

The deck should float half way between the locked up and locked down position when properly adjusted.

| WARNING |
| --- |
| The springs are under tremendous tension and could cause severe injury if care is not taken to slowly release the tension. |

1. Put the deck in the up position with both deck locks engaged. Set a safety stand under the end of the hinge deck.
2. Hook one end of a 2-ton come-along to the clevis or chain near the deck connection. Hook the other end of the come-along to the side sill or similar structure under the B deck. This must be done before removing the nut from eye bolt (PCI101001) or hex bolt (PCB100025) from the deck. Tighten the hex bolt for more upward tension. Loosen the hex bolt for less tension. It is often necessary to replace the hex bolt because the threads are damaged.
3. Operate the deck locking/lift mechanism.
4. If there is still not enough tension to reach proper adjustment, it may be necessary to tighten the eyebolt at the deck connection. The tension will again have to be removed from the spring prior to tightening the eyebolt.
5. Again, test the deck operation and determine that the deck floats half way between the locked up and locked down position.
6. If there is still not enough tension, a few links can be removed from the spring side of the pulley and the process repeated until the deck floats properly.
7. If it is not possible to achieve the proper deck lift, the spring will have to be replaced with a new spring and the process started over.

| NOTICE |
| --- |
| It is very important to keep the pulley assembly in the proper orientation. The flat spot on the pulley assembly needs to be held close to its proper position or the pulley will not aid in the lift of the deck. Also, if too much chain is removed from the non-spring side, the pulley will not work properly.<br>(See pulley sketch in Figure 12) |

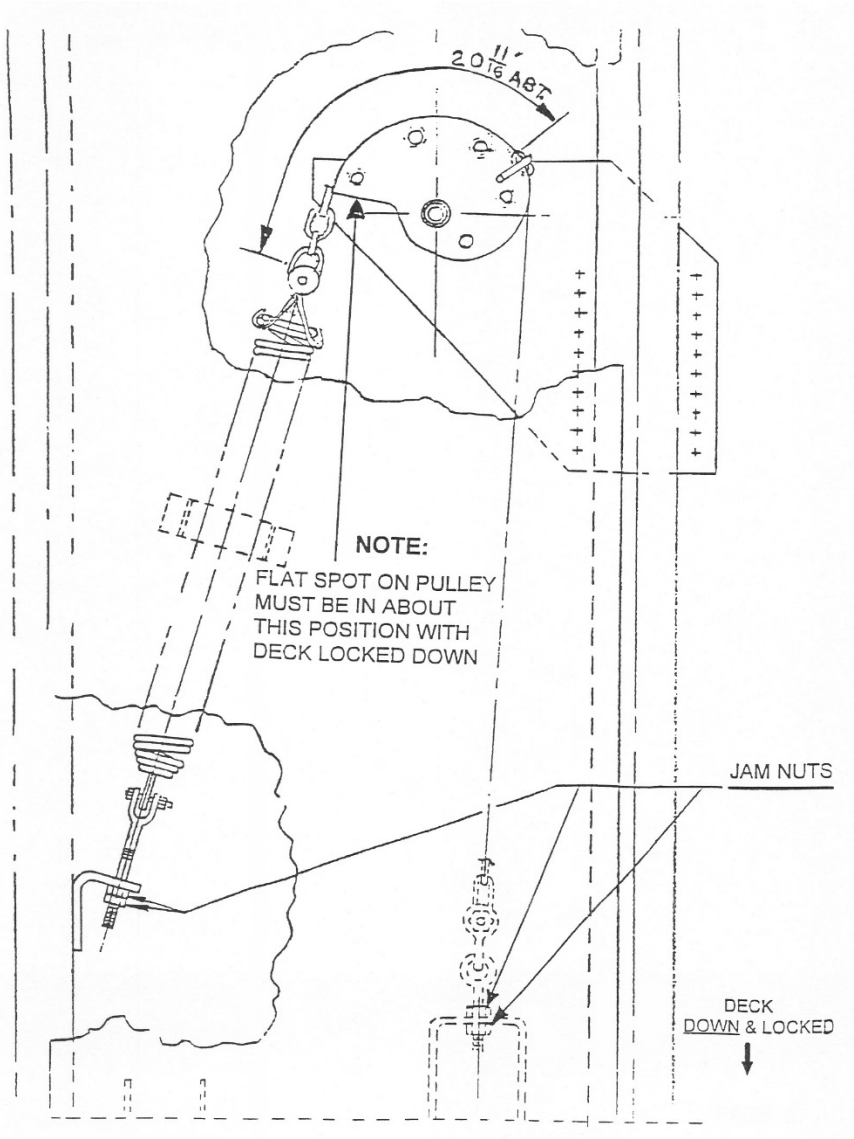



**Figure 12. Pulley Assembly**

## Repairing Thrall Car Style Deck Lock

The Thrall Car deck lock was designed as an improvement to the original W&K lock system. The Thrall Car lock pin was enlarged to make it more durable in service. A taper was added to the end of the pin to slow down the wear on the receiver and the lock assembly and to aid engagement. Because of this tapered pin design, it is very important to follow the Lubrication Procedure for this lock and receiver. If the system is over lubricated, the lock pin could release under certain vibration intensive situations.

1. Replace all broken parts with new.
2. Replace all worn parts with new. (See inspection procedure on Page 15.)
3. Re-apply the new parts as shown in Figure 13. Pay particular attention to the $^{3}/_{4}$" gag dimension. This $^{3}/_{4}$" gag is what allows the lock pin to have constant intimate contact with the receiver. This feature slows wear and keeps the deck firmly seated on the cones and seats in both loaded and empty situations.

| NOTICE |
| --- |
| On the newest Thrall Car lock design used on tri-levels built after January 1994, the tapered pin to receiver plate function is used only in the down position. The end of the pin is ground flat where it contact the receiver in the up position. |

| NOTICE |
| --- |
| This newest pin, with the flat spot on the end, cannot be used with the older style lock receiver plate which has a taper on each end. The new pin can only be used with the newest receiver. (See Figure 14 for application of newest style receiver and pin.) |

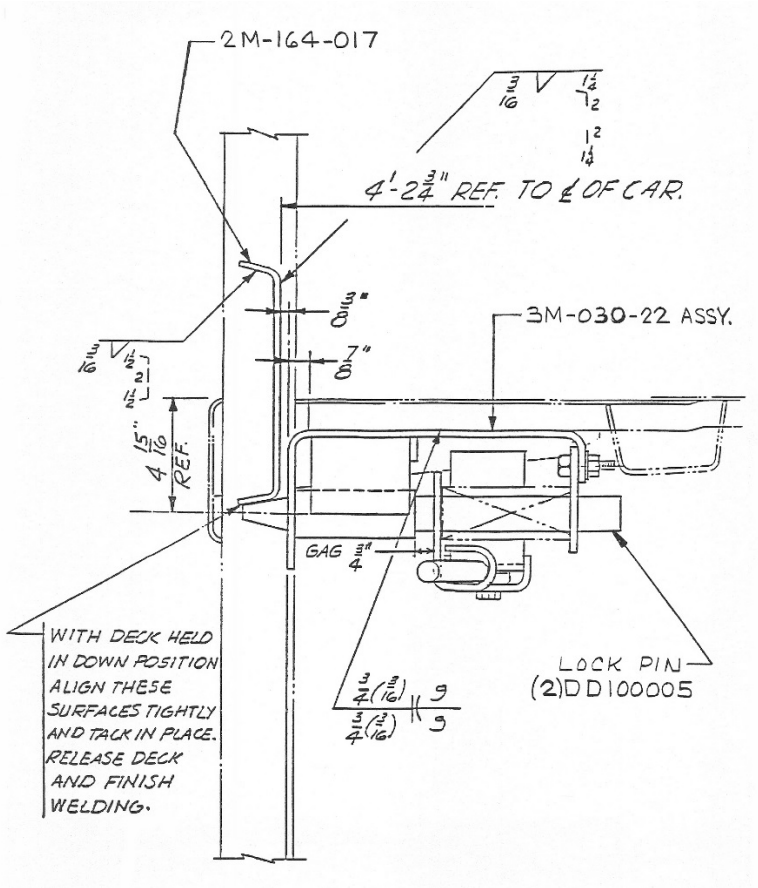



**Figure 13. Applying New Parts on Thrall Car Style Deck Lock**

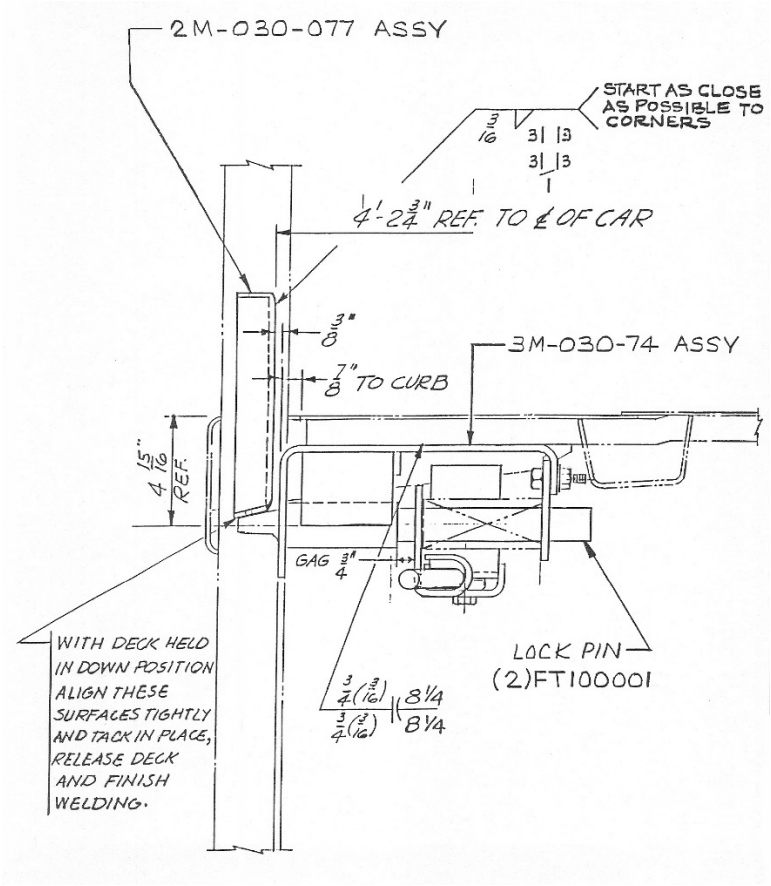



**Figure 14. New Receiver on Thrall Car Style Deck Lock**

## Repairing the W&K Deck Lock System

1. Replace all parts which were determined to be out of tolerance or defective during the inspection. (See inspection procedure on Page 15.)
2. Remove and replace any cracked welds using a 70,000 lb. rod or wire.
3. Operate the lock after reassembly to insure that there is no binding or interference. The lock pins should fully engage.
4. Refer to sketch in Figure 15 when replacing parts.

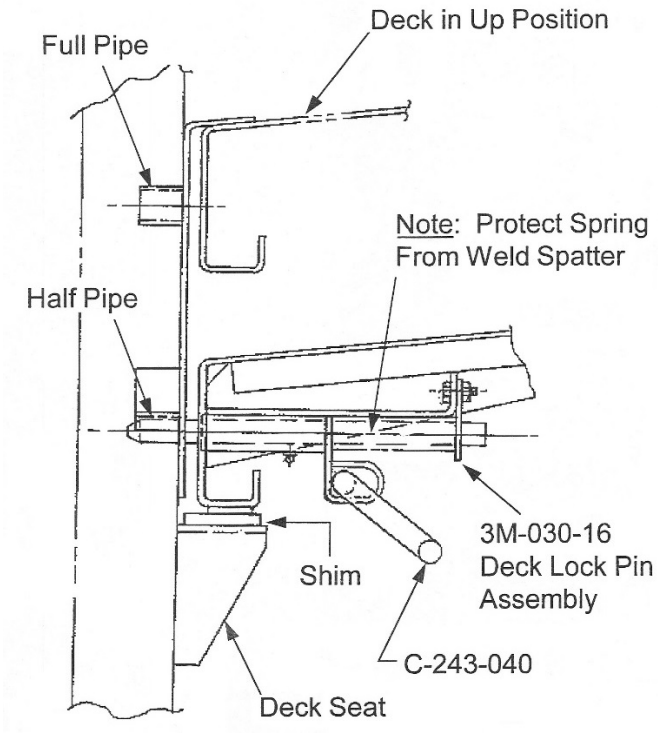



**Figure 15. W&K Hinge Deck Lock**

## Adding Drain Holes to Longitudinal Stiffeners

Each hinge deck longitudinal needs a drain hole in one end or the other to allow water to escape. Some holes were placed at the striker end while other autoracks had the holes placed in the plate below the hinge. Some autoracks had a hole placed in the longitudinal member near the hinge. (See Figure 16)

1. If no drain hole exists, ream a hole in the cap plate at the striker end of the longitudinal members.
2. Refer to Figure 16.

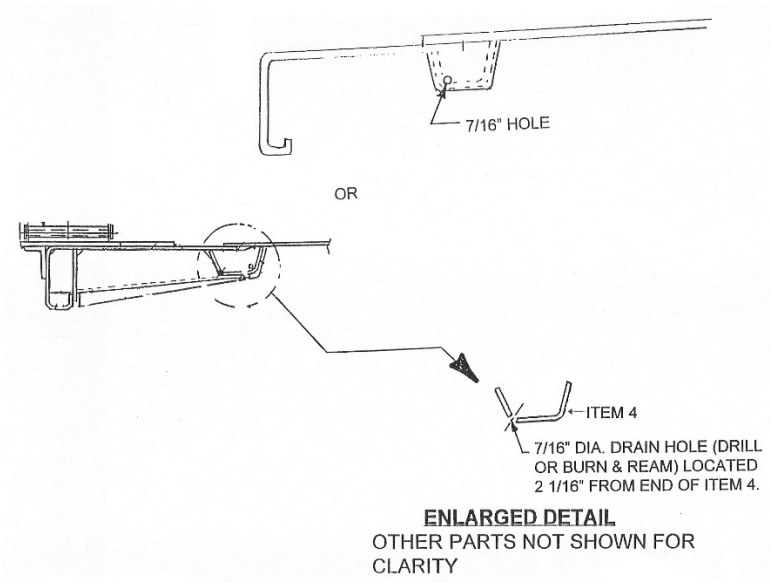



**Figure 16. Adding Drain Holes to Longitudinal Stiffeners**

## Repairing Other Deck Sheet Cracks

1. Always drill a $^{1}/_{4}$" hole at the end of the crack. Drill a hole at each end if the crack does not extend to the edge of the sheet.
2. Whenever possible, apply a backup bar which extends 1" past the crack in all directions. Weld all the way around the backup bar. The backup may be placed on the top or bottom side, whichever provides the best repair and welding.
3. Apply a seal weld if a bar cannot be used.
4. Always "V" out the crack using an air-arc or grinder from the opposite side of the sheet.
5. Fully weld the crack. Penetrate the weld into the backup bar.

## Repairing Cracks in Deck Longitudinal Stiffeners

1. Remove and re-weld any cracked welds connecting the deck plate or deck curb to the stiffener.
2. If cracks exist in the stiffener, drill a 1/4" termination hole at each end of the crack. “V” out the crack using a grinder or an air-arc. Re-weld the crack and the holes. Grind off any excess weld.
3. Make the deck stiffener patch as shown in Figure 17.
4. Fit and weld the patch centered over the crack. Weld completely around the patch.
5. Clean and paint the area.

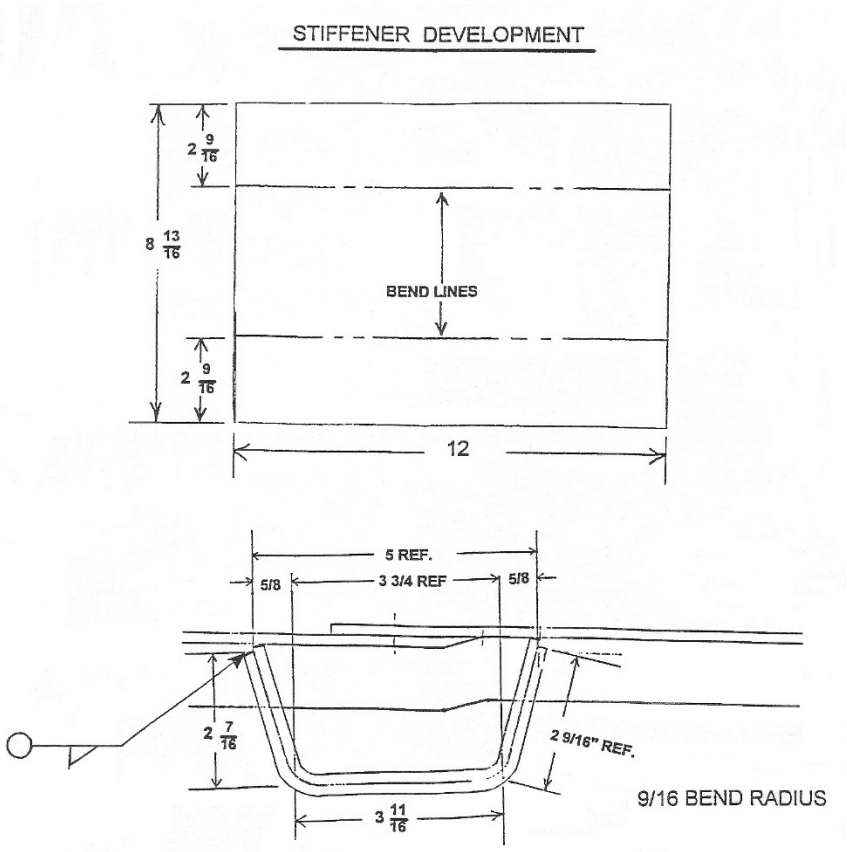



**Figure 17. Repairing Cracks in Deck Longitudinal Stiffeners**

# Suggested Repair Procedures

## Repair and Adjustment of Hinge Deck Cones and Supports

| NOTICE |
| --- |
| The hinge deck lift assemblies and the hinge deck lock assemblies should be re-worked before the cones and seats are adjusted. |

The Thrall Car and W&K hinge decks use the same basic support systems. All six supports should make contact at the same time so all six points support the hinge deck when loaded.

| WARNING |
| --- |
| Always use a safety stand under the end of the hinge deck when working on the supports with the deck up. |

1. Remove all worn parts using the criteria given in the Inspection section on Page 18.
2. Loosely set the new parts into place.
3. Move the hinge deck down into the locked position.
4. Use shim plates under the lower cones or supports as needed so they contact the corresponding part on the deck.
5. Shim the bottom cones up to contact the top cones and shim the deck support up to contact the deck curb.
6. It is often easier to burn all bottom cones loose, even the ones which don't need replacement. Then all cones can be shimmed at the same time to make proper contact with the top cones.
7. When complete there should be no play in the hinge deck when locked down. This is very important to reduce future wear.

## Repair of Crack in Deck Plate along Tie Down Track

1. Drill a $^1/_4$" diameter hole in each end of each crack. Care must be taken to be sure the hole is at the very end of the crack.
2. Seal weld the deck sheet crack on the top side. Weld from one termination hole to the next termination hole. Continue to weld the next crack and so on if cracks are intermittent between a series of skip welds. See Figure 18.
3. Gouge the bottom of the deck plate to sound metal. Use a metal disc grinder or Arc-air for the gouging process.
4. Weld the deck complete including the termination holes.
5. If the crack travels under the tie down trough, gouge out the cracked area. Use the trough as the backup plate and weld 100% into the trough.
6. Clean and paint per AAR shop practice.

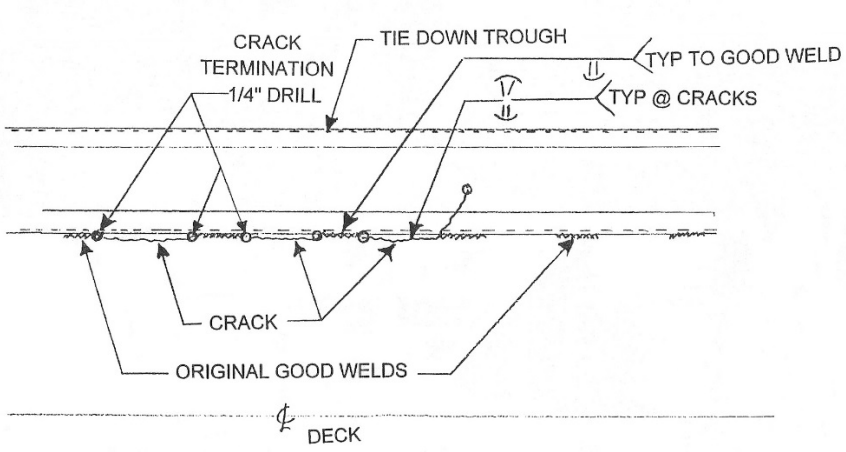



**Figure 18. Repair of Crack in Deck Plate**

## Application of Gusset Plate at End of Curb by Deck Lock on Old W&K Decks

The curb above the deck seat on the number one post should have a vertical gusset plate in the longitudinal direction. This gusset plate connects the curb flange to the cross member and the end gusset plate. Early design W&K racks built before September 1981 had no gusset applied.

1. Apply a gusset as shown in Figure 19.
2. Repair any cracks in this area before applying the gussets. Use sound repair practices such as the procedure found in Repairing Other Deck Sheet Cracks

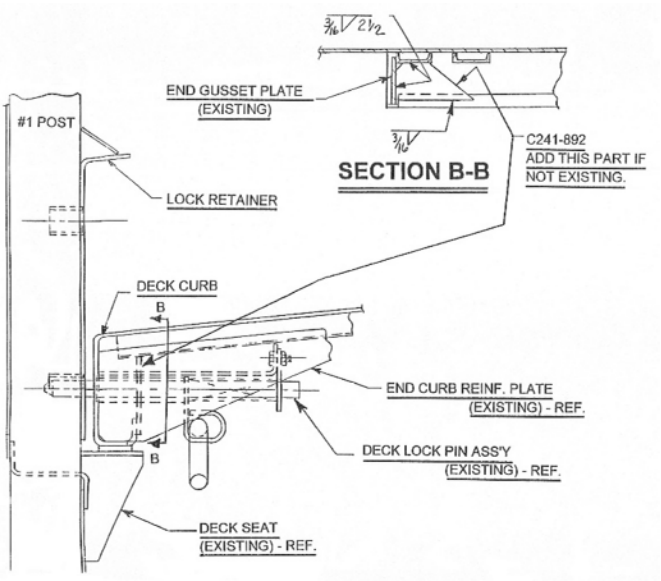



**Figure 19. Applying Gusset Plate**

## Adding Deck Sheet Reinforcement between Tie Down Troughs (Old W&K Racks)

Very early W&K Tri-Levels built before 1976 may not have been built with lateral deck reinforcements between tie down troughs. If no reinforcement exists, add one per hinge deck as shown in Figure 20.

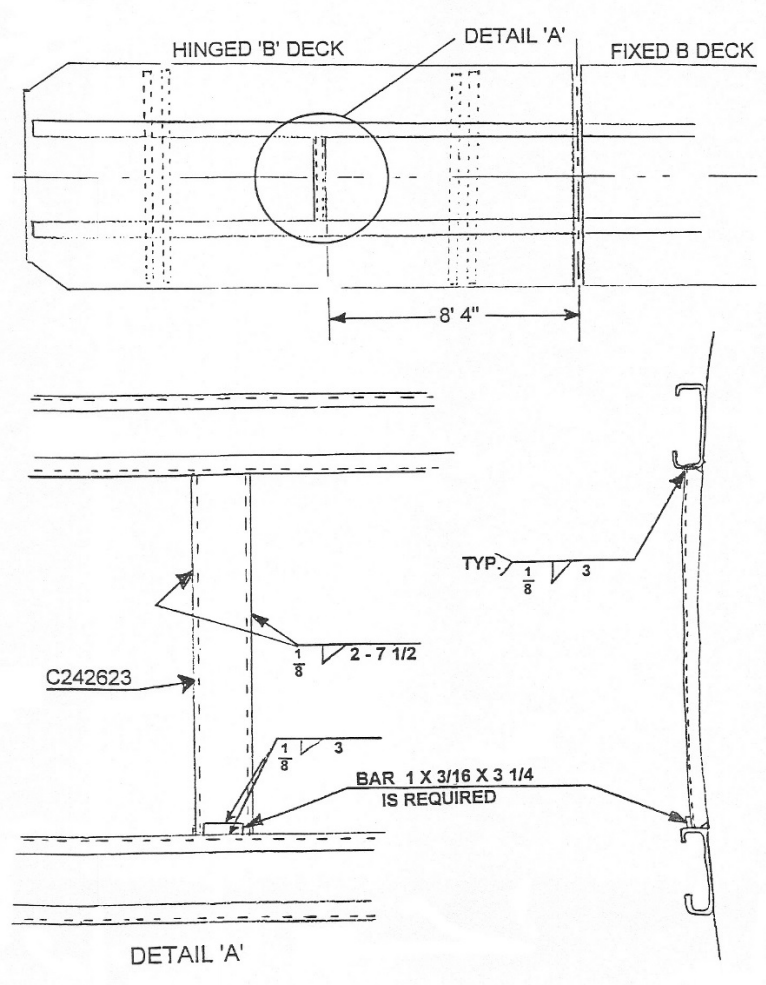



**Figure 20. Adding Deck Sheet Reinforcement**

## Hinge Deck Lubrication

1. AAR approved grease should be applied to the hinge deck lock pins where they go through the pipes (grease fitting) and at the back plates.

| CAUTION |
| --- |
| Do not grease the tapered ends of the deck lock pin or the receiver plate. Grease on the tapered surfaces could cause the lock pin to disengage. |

2. AAR approved grease should be applied to the W & K style deck lift cam fitting and/or deck lift cam pin fitting.
3. AAR approved dry lubricant should be applied to the end of the deck lock pin where it engages the lock receivers. This is especially important on the tapered end of the Thrall style lock pin. Grease could cause the lock pin to back out.
4. AAR approved dry lubricant should be applied to all hinge deck lock pin receivers. No grease.
5. AAR approved dry lubricant should be applied to the hinges.

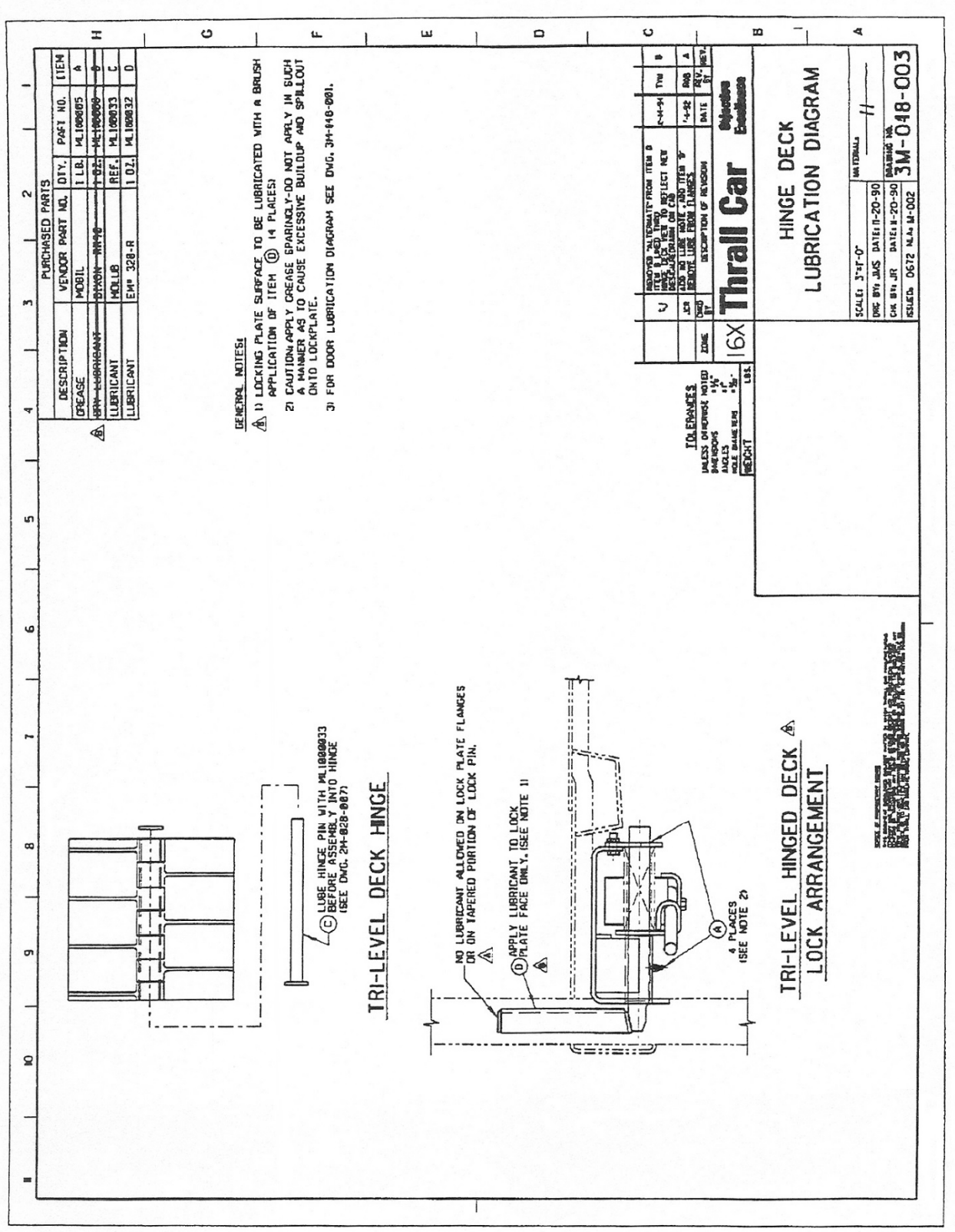



**Figure 21. Hinge Deck Lubrication Diagram**

# AAR M-970 Rack Certification Procedures

## 2.1 Deck and Securement Devices

Decks and securement devices must be inspected and the following repaired:

### 2.1.2 B-Deck Mechanism

- If locking pin holes are worn in excess of 50%, replace bushing.
- If locking pin spring is broken, replace.
- Replace loose or missing locking pin bracket bolts and apply locknuts.
- Replace missing locking pin brackets or guides.
- Weld and gusset any cracked B-Deck plate to rack manufacturer's recommendations. ·
- Replace hinge or hinge pin if broken or worn in excess of 25%.
- If B-Deck cones are missing, broken or worn in excess of 50%, replace entire set (on that end).
- Remove shaft from B-Deck counterbalance bell crank; replace shaft, bell crank, and outside bushings when worn in excess of 1/8" and add grease fitting; reassemble the shaft to the bell crank.
- Replace defective counterbalance spring.
- B-Deck must be adjusted so as to be hand operated and lock in both the up and down positions.

## Trinity Contact Information

4084 Sandshell Drive
Fort Worth, Texas 76137

Telephone: (800) 336-7305
Fax: (817) 378-2043
E-mail: trinitypartssales@trin.net
www.trinityrail.com/parts