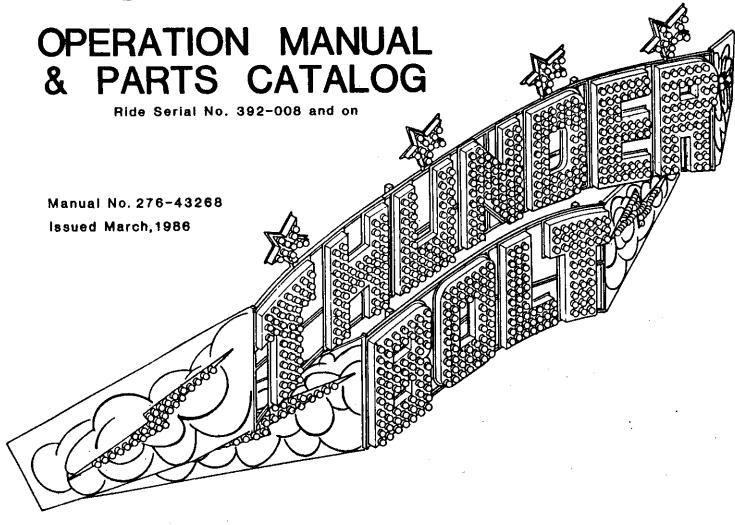
Ruthoffer 05220

THUNDERBOLT





CHANCE RIDES, INC.

4219 Irving
P.O. Box 12328
Wichita, Kansas 67277-2328
Phone (316) 942-7411
Telex 9109976518 (CHANCE WIC)



Number:

B090R1002-0

Date:

May 14, 1986

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

Ride:

ALL RIDES

Subject:

Field Performance Testing of Amusement Rides

The following specifications conform with ASTM F846 standard guide for Testing Performance of Amusement Rides and Devices, in effect on date of ride manufacture.

- 1. <u>Erection or Installation Testing</u>: Each erection or installation of a ride shall be given an inspection prior to carrying passengers that shall include but not be limited to the following:
- A. Determine that ride has been erected according to set-up procedures included in the operations manual.
 - B. Inspect field inspection points listed in the Field Inspection Guide.
- C. Visual check of all passenger carrying devices including restraint devices and latches, and the pins and capscrews securing them.
- D. Visual inspection of entrances, exits, stairways and ramps and devices securing them.
- E. Test of all communications equipment necessary for operation of the ride or device.
- F. Operate ride to determine that direction of travel conforms to the information plate, ride manual, field inspection guide or specification sheet.
- G. Operate the ride for a minimum of three ride cycles to determine that the ride speed does not exceed the speed specified in the information plate, ride manual, field inspection guide or specification sheet.
- 2. <u>Daily Pre-Opening Inspection</u>: This inspection shall include a daily inspection of all items as specified in the previous Section 1. Erection or Installation Testing.
- 3. <u>Documented Field Performance and Operational Testing:</u> Documentation and certification shall be performed by a person who by demonstrated education and field experience is knowledgeable with the construction, erection, operation, maintenance and repair of amusement rides.

4. Operational Load Testing: Any operational test including load testing performed on a ride shall be completely nondestructive in nature. Overload testing exceeding the rated limits listed on the information plate, operation manual, field inspection guide or specifications sheet shall be deemed inappropriate. Where maximum total passenger weight is not readily available passenger capacity multiplied by 170 pounds per adult and/or 90 pounds per child may be used.

Nondestructive testing with inert loads can be accomplished only with special care as to placement of the load so that it is centered both vertically and horizontally as would be the load of the passenger it replaces. Extra seat reinforcement must be used to offset any load concentration created. Such tests shall be documented and certified as nondestructive by the person making the test and the agency requiring it. Results of all load tests shall be communicated to the factory upon completion by the Certifying Agency.

Conducting a nondestructive operational load test assures the testing agency only that it will carry a given load in a given way at a given moment and in no way assures future safety of the ride.

Conducting a destructive load or overload test also assures the testing agency that it will carry a given load in a given way at a given moment and in no way assures future safety of the ride. However, it also introduces the probability of inflicting serious irreparable damage to the ride that may or may not be apparent at the time of the test.

We consider inert load testing of any nature appropriate only for situations requiring experimental development of stress-strain testing during prototype development. A certificate of load test on the prototype and certification that each production ride met the design criteria when it was manufactured is available from the factory upon request.



Number: **B392R1004-A**

Date: Dec. 31, 1988

Supersedes: A392R1004-0

(6-30-86)

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

All Units Which Have Been Reworked To Comply Effective Serial Numbers: With Service Bulletin B392R1027-0.

Ride: THUNDERBOLT

Subject: Installation, Inspection And

Adjustment Of Spreader Bars

Safety Alert Bulletin Number A392R1004-0 is superseded by this Service Bulletin. It is no longer in effect and should be destroyed.

CHANCE RIDES, INC. wishes to emphasize the importance of the spreader bars on THUNDERBOLT amusement rides. Worn, damaged or improperly adjusted spreader bars can cause damage to the sweeps, spreader bars and center hub, and cause rough operation, which can result in injury to passengers.

READ THESE INSTRUCTIONS THOROUGHLY AND BECOME FAMILIAR WITH THE ENTIRE PROCEDURE. All work must be performed by competent, qualified mechanics, capable of understanding the function of the parts and their proper installation.

Complete the spreader bar inspection, installation and adjustment procedure using the instructions on the following pages of this If you have any questions regarding the instructions or this procedure, contact the CHANCE CUSTOMER SERVICE DEPARTMENT.

INSPECTION OF SPREADER BARS AND ATTACHING EARS

Before adjusting the spreader bars, inspect all spreader bars and their attaching ears for cracks or bends. Inspect the spreader bar rod ends and the bushings in the attaching ears for wear or damage, and replace if necessary. Check the condition of all pins and hairpins.

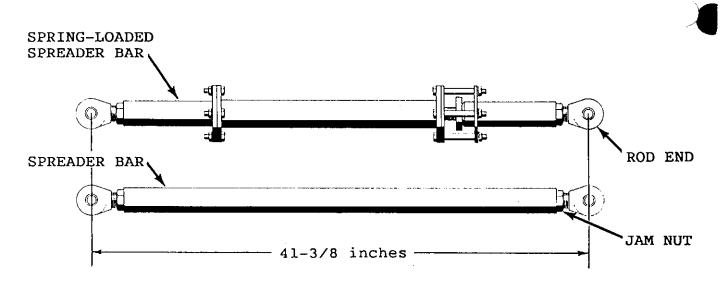
DO NOT OPERATE THE RIDE WITH QUESTIONABLE SPREADER BARS.

IMPORTANT: Do not attempt to repair spreader bars in the field.

Any spreader bar which has been welded, drilled, or otherwise repaired must be discarded and replaced with a new part.

SPREADER BAR INSTALLATION AND ADJUSTMENT PROCEDURE

1. With all spreader bars removed from the ride, including the spring loaded spreader bar, loosen all jam nuts (two on each spreader bar).

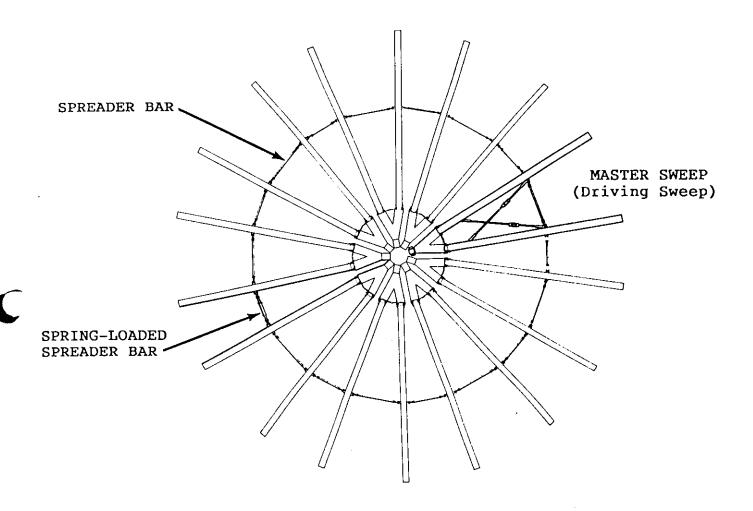


Measure the length between the rod ends, center-to-center, on all including spring-loaded bars, the spreader bar. measurement must be 41-3/8 inches. Adjust the rod ends, but do not tighten the jam nuts at this point. THIS LENGTH IS USED AS A "BASE-LINE" MEASUREMENT ONLY, AND MUST BE ADJUSTED AS REQUIRED IN THE FOLLOWING STEPS.

IMPORTANT: Both rod ends must be threaded into the spreader bars an equal number of turns. Always adjust both rod ends equally, within one-half turn.

▶3. Install the spreader bars on the ride, using the correct pins and hairpins.

NOTE: The spring-loaded spreader bar must be installed 180° from the master sweep (driving sweep).

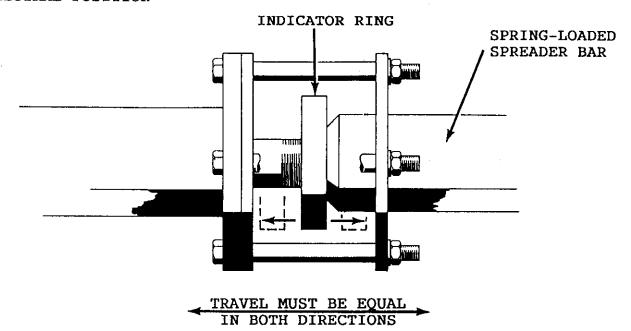


- 4. The vehicles must be installed to properly adjust the spreader bars. If the vehicles are not on the ride, install them at this time.
- 5. Rotate the ride counter-clockwise at least one complete revolution by hand, using two or three men.

NOTE: Open the hand valve on the hydraulic motor for ease of turning.

As the ride turns, watch the indicator ring on the spring-loaded spreader bar, as the spreader bar extends and retracts. The indicator ring must travel the same distance from "neutral" in both directions.

NEUTRAL POSITION



6. If the travel is equal in both directions, tighten the jam nuts on all spreader bars.

If the travel is not equal in both directions, adjust the length of each spreader bar (either longer or shorter) by turning the rod ends. A SPREADER BARS, INCLUDING THE SPRING-LOADED SPREADER BAR, MUST BE THE SALLENGTH. If one spreader bar is adjusted to a longer length, ALL spreader bars must be lengthened by the same amount.

Repeat Steps 5 and 6 until the travel is equal.

- 7. As a final check, get into the vehicle closest to the spring-loaded spreader bar. Observe the action of the spring-loaded spreader bar during normal ride operation, at both low and high speeds. If the indicator ring travel is equal in both directions, the adjustment is satisfactory.
- 8. Permanently mark all sweeps so that they can be installed in the same location every time the ride is set up.
- 9. Check the spreader bar adjustment monthly, or at every set-up, using the observation procedure in Step 7.



Number: 8392R1010-0

Date: June 30, 1987

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers: 392-008-86 through 392-014-86

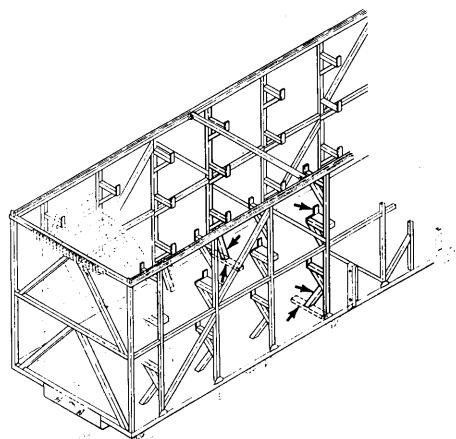
Ride: THUNDERBOLT

Subject:

Auxilliary Trailer

Rack Rework

CHANCE RIDES, INC. recommends that the following rework be performed or THUNDERBOLT amusement rides with the above noted serial numbers. rework reinforces the vertical members of the vehicle racks for added rigidity.



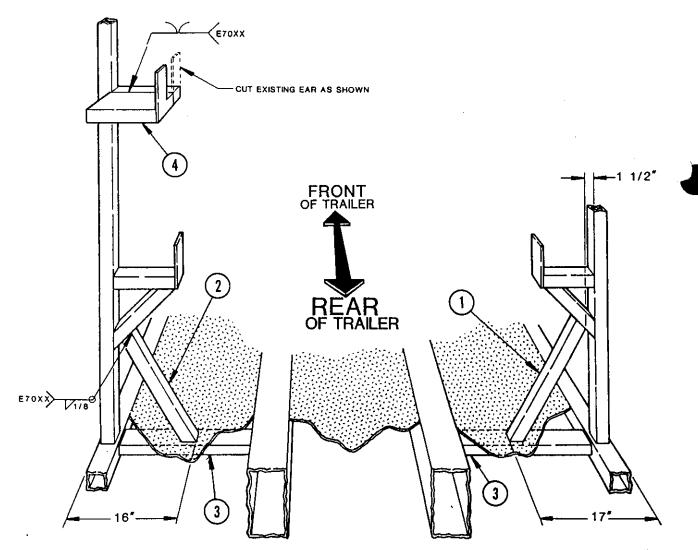
Order kit number K76-0300-00, which includes all parts necessary for on complete ride. Install the kit using the instructions provided on the reverse side of this bulletin.

INSTALLATION INSTRUCTIONS

All work must be performed by a certified welder, capable of understanding the function of the parts and their proper installation.

Read these instructions thoroughly and make sure you understand then before installing the kit. Identify all parts by checking them against the parts list. If any parts are missing, notify the CHANCE CUSTOMER SERVICE DEPARTMENT.

- 1. Locate and weld the floor braces (Item #3) as shown.
- 2. Locate and weld the angle braces (Items #1 and #2) as shown. Pay particular attention to the different length angle braces for each side of the trailer.
- 3. Cut the ears flush with the tubes on the existing vehicle hangers as shown. DO THIS ONLY ON THE MIDDLE ROW OF HANGERS ON THE ROADSIDE WALL OF THE TRAILER.
- 4. Locate and weld the offset vehicle hangers (Item #4).



PARTS LIST

Kit Number K76-0300-00 Auxilliary Trailer Rack Rework

Ouantity	Part Number	Description
6	376-09214	ANGLE BRACE - 25-3/16 Lg. (392-517-048
6	376-09215	ANGLE BRACE - 19-5/8 Lg. (392-517-049)
12	376-09216	FLOOR BRACE (392-516-037)
6	37 750	OFFSET VEHICLE HANGER (K76-0300-01)
	6 12	6 376-09214 6 376-09215 12 376-09216



Number: B392R1015-0

Date:

June 30, 1987

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

392-008-86 through 392-010-86

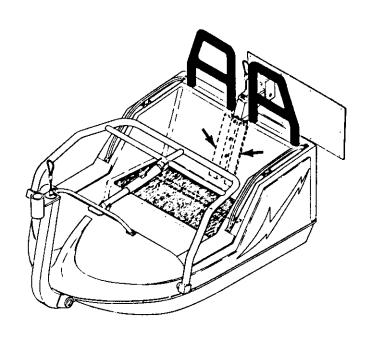
Ride:

THUNDERBOLT

Subject: Vehicle Back Brace

A kit is now available to provide additional support in the back rest area of the vehicles on THUNDERBOLT amusement rides with the above noted serial CHANCE RIDES, INC. recommends that this kit be installed to extend the service life of the vehicle fiberglass.

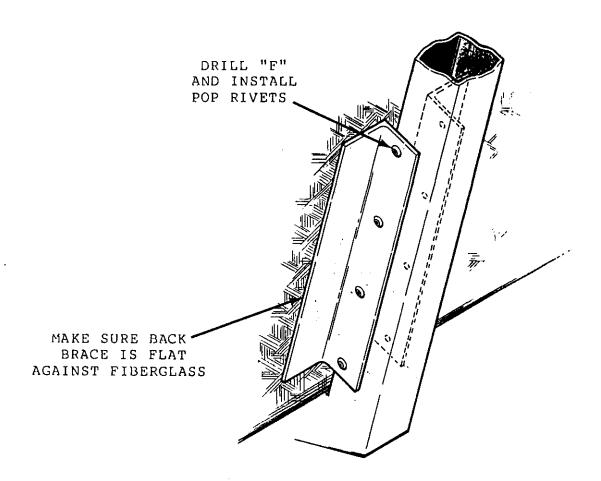
kit number K76-0304-00, which includes all necessary parts hardware for one complete ride. Install the kit using the instructions provided on the reverse side of this bulletin.



Quantity	Part Number	Vehicle Back Description	Brace
36 144	376-09094 684-61451	•	(392-111-001)

INSTALLATION INSTRUCTIONS

All work must be performed by a competent, qualified mechancics, capable of understanding the function of the parts and their proper installation. Read these instructions thoroughly and make sure you understand them before installing the kit.



- 1. Remove the back panel from the vehicle.
- 2. Place the back brace on the vehicle frame fo that it is flat against the fiberglass in the back rest area.
- 3. Locate and drill holes (Size "F") and install the back brace with poprivets.
- 4. Use the same procedure to install the back brace on the opposite side of the vehicle frame
- 5. Install the back panel.
- 6. Repeat Steps 1 through 5 on the remaining vehicles.



Number: B392R1016-0

Date: September 9, 1987

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

392-008-86 through 392-010-86

Ride:

THUNDERBOLT

Subject:

Vehicle Frame

Pivot Modification

As a safety precaution, CHANCE RIDES, INC. requires that the owners of THUNDERBOLT amusement rides with the above noted serial numbers perfor the modification described in this bulletin. This modification will provide improved bearing retention in the vehicle frame pivot.

Order kit number K76-0306-00, which includes all necessary parts ar hardware for one complete ride. Install the kit using the instruction provided on the reverse side of this bulletin. Fill out the attache Certification Of Compliance for the installation no later than January 1 1988.

PARTS LIST

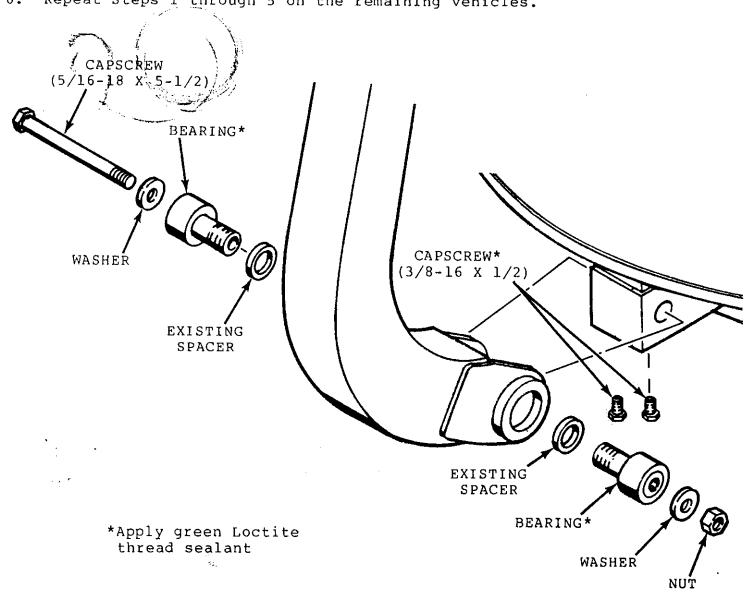
Kit Number K76-0306-00 Vehicle Frame Pivot Modification

Quantity	Part Number	Description
36	376- 0 4416	BEARING (392-136-001)
18	686-07531	CAPSCREW - $Gr.8 (5/16-18 \times 5-1/2)$
18	691-48044	NUT - Lock (5/16-18)
36	696-85306	WASHER (5/16)
36	686-07662	CAPSCREW (3/8-16 x 1/2)

INSTALLATION INSTRUCTIONS

All work must be performed by a competent, qualified mechancics, capable understanding the function of the parts and their proper installation.Read these instructions thoroughly and make sure you understand them before installing the kit.

- Remove all four set screws from the vehicle frame pivot.
- 2. Unscrew and discard the bearing on one side of the vehicle. to keep the spacer. Install the new bearing and existing spacer in the frame using green Loctite thread sealant, and tighten the bearing. Repeat the procedure on the other side of the vehicle.
- Install the $5/16-18 \times 5-1/2$ capscrew, washers and nut through the new bearings as shown. Tighten the nut to 15-18 lb-ft.
- Install 3/8-36 x 1/2 capscrews in the two set screw holes using green Loctite thread sealant, to prevent grease from escaping.
- Use a grease gun to liberally lubricate the new bearings.
- 6. Repeat Steps 1 through 5 on the remaining vehicles.





Number: B392R1020-0

Date: March 21, 1988

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers: 392-008-86 through 392-014-87

Ride: THUNDERBOLT

Subject: Master Sweep Bearing Cap Rework (Capscrews)

As a safety precaution, CHANCE RIDES, INC. requires that the owners of THUNDERBOLT amusement rides with the above noted serial numbers perform the modification described in this bulletin. This modification will provide improved retention of the master sweep bearings in the center hub.

Order kit number K76-0317-00, which includes all necessary parts and hardware for one complete ride. Install the kit using the instructions provided on the following pages of this bulletin. Fill out the attached Certification Of Compliance for the installation within 15 days of receipt of the kit.

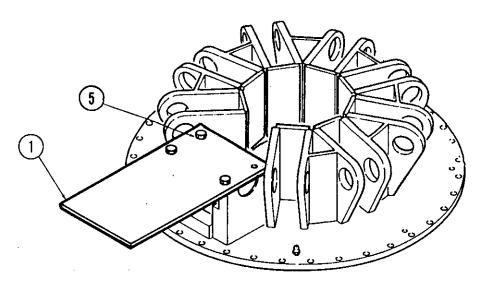
PARTS LIST

Kit Number K76-0317-00 Master Sweep Bearing Cap Rework

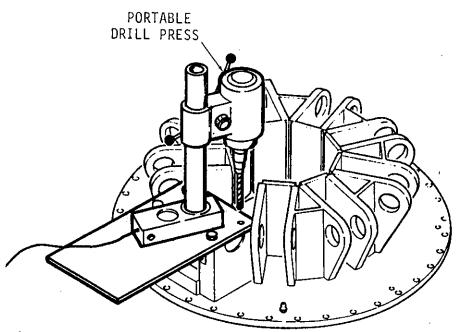
Item No.	Quantity	Part Number	Description
1	1	376-31703	Drill Guide (K76-0317-01)
2	4	686-09831	Capscrew - $7/8-9 \times 4-1/2$ " (Grade 8)
3	4	376-85568	Hardened Washer - Special (K76-0317-02)
4	1		Tap (7/8-9 Thread)
5	3	686-09512	Bolt - 3/4-10 x 1-1/2"
6	3	686-10226	Bolt - 7/8-9 x 1-1/2"
7	1	 -	Drill Bit (49/64" Diameter)
8	1		Drill Bit (29/32" Diameter)

INSTALLATION INSTRUCTIONS

- 1. Use the chain hoist to remove the two sweeps from the master sweep.
- 2. Using the hoist to support the weight of the master sweep, remove the four 3/4-10 bolts from the bearing caps. Remove the cap and move the master sweep out of the way.

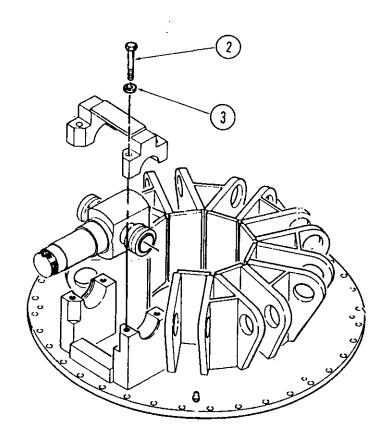


3. Use three $3/4-10 \times 1-1/2$ " bolts (Item #5) to mount the drill guide (Item #1) to the bearing blocks on the center hub as shown.



4. Using a l-1/4" capacity portable drill press with a magnetic base, locate the drill exactly over the existing threaded hole. Drill the hole to 49/64" diameter, 3" deep, using the bit provided (Item #7). DO NOT USE A HAND-HELD DRILL MOTOR.

- 5. Tap the hole to 7/8-9, 2-1/2" deep using the tap provided (Item #4). Install a $7/8-9 \times 1-1/2$ " bolt.(Item #6).
- Remove the next 3/4-10 bolt and repeat Steps 4 and 5 on that hole.
- 7. Repeat Steps 4, 5 and 6 until all four holes have been drilled and tapped to 7/8-9.
- 8. Remove the capscrews and the drilling guide.
- 9. Drill the four holes in the bearing cap to 29/32" diameter, using a drill press and the drill bit provided (Item #8). DO NOT USE A HAND HELD DRILL MOTOR.



- 10. Install the master sweep and bearing cap using the 7/8-9 capscrews (Item #2) with the special hardened flatwashers (Item #3) under the heads. Tighten the capscrew to 460 ft-lbs. torque.
- 11. Reassemble the sweeps to the master sweep.
- 12. Check the torque of the capscrews at weekly intervals or at every set-up, whichever occurs first.

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Number: B090R1022-0

Date: March 21, 1988

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

Ride: ALL

Subject: **NON-DESTRUCTIVE TESTING**

REFERENCE STANDARD:

- 1. ASTM-F24 Standards on Amusement Rides and Devices
 - a. F846-86 Testing Performance of Amusement Rides and Devices
 - b. F853-86 Maintenance Procedures for Amusement Rides and Devices
 - c. F893-87 Inspection of Amusement Rides and Devices

Chance Rides at the time of design and manufacture determines by calculations and testing of a prototype amusement ride the appropriateness for use, of not only the parts, but the entire system of a newly designed ride. These calculations and tests are utilized to, as feasibly as possible, determine the requirements for expected design life of major components. Based on this design criteria, Chance Rides does not identify critical components on amusement rides to be singled out for non-destructive testing.

If through field experience there is an indication that a structural or mechanical problem may develop on rides currently operating, Chance Rides will notify owners by bulletin of the recommended procedures to inspect or correct the possible problem. Any possible defect which could affect the continued safe or proper operation of the ride should be reported immediately to the manufacturer by the owner/operator. This information is necessary so that a determination can be made for either the repair or replacement of possible defective parts.

Field repairs should not be undertaken without the approval and proper instructions from the manufacturer and should be performed by qualified personnel. These persons should have a complete understanding of both the component's function and the manufacturer's instructions.

It is the responsibility of the individual inspector to thoroughly inspect the ride as he deems necessary based on his knowledge and field experience and manufacturer's recommendations. If the inspector finds an area or component that could be a problem, structural or otherwise, the factory should then be notified. It is then the responsibility of the inspector to ensure that the manufacturer's recommendations for repair, replacement or otherwise have been completed and are in compliance with the required specifications.

Load testing is a destructive form of testing and is not recommended by the manufacturer as per our bulletin #B090R1002-0 dated May 14, 1986.

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Number: B392R1023-0

Date: Nov. 28, 1988

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers: All Units

Ride: THUNDERBOLT

Subject: Operation Of Shut-Off

Valves For Hydraulic

Leveling Jacks

As a safety precaution, CHANCE RIDES, INC. requires that the owners of all THUNDERBOLT amusement rides instruct their employees to follow the correct procedure for operation of the shut-off valves for the hydraulic leveling jacks. Safety decals are enclosed with this bulletin to remind employees of these instructions.

Install the five decals (part no 276-2203200), one on each leveling jack and one near the shut-off valves. After the decals have been installed, always follow the recommended operating procedures.

A WARNING

RETRACT THE HYDRAULIC LEVELING JACKS AND CLOSE SHUT-OFF VALVES FOR THE JACKS DURING NORMAL RIDE OPERATION.

If the valves are left open, hydraulic pressure from the drive system, or pressure from hydraulic oil expanding due to heat can cause one or more of the jacks to extend, making the ride unstable. Injuries to passengers and/or bystanders can result.

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Number: B392R1027-0

Date: Dec. 31, 1988

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers: 85-53008, 392-009-86 and 392-010-86

Ride: THUNDER BOLT Subject: Spreader Bar

Subject: Spreader Bar Inspection

And Rework



WARNING: FAILURE TO COMPLY WITH THIS SERVICE BULLETIN CAN RESULT IN FAILURE OF THE SPREADER BAR SYSTEM AND INJURY TO PASSENGERS.

CHANCE RIDES, INC. has developed a new spreader bar system which provides longer life of the spreader bars, sweeps and center hub, and increased passenger safety.

ALL OWNERS OF THE ABOVE NOTED THUNDERBOLT AMUSEMENT RIDES ARE REQUIRED TO PERFORM THE INSPECTION AND APPROPRIATE REWORK TO UPDATE THEIR SPREADER BARS TO THE NEW DESIGN.

Perform the inspection as described on the following pages of this bulletin to determine the necessary rework required for your ride. Order the appropriate rework kit(s) listed on the following pages of this bulletin, depending upon the configuration of your ride:

Install the kit(s) using the instructions provided with each kit. All work must be performed by competent, qualified mechanics, capable of understanding the function of the parts and their proper installation.

Fill out the attached Certification Of Compliance for the inspection and the rework within fifteen (15) days of receipt of this bulletin. If there are any questions regarding the instructions or this repair, contact the CHANCE CUSTOMER SERVICE DEPARTMENT.

INSPECTION PROCEDURE

Inspect the spreader bar system on your ride, comparing it to the illustrations on the following pages.

EQUAL LENGTH SPREADER BARS

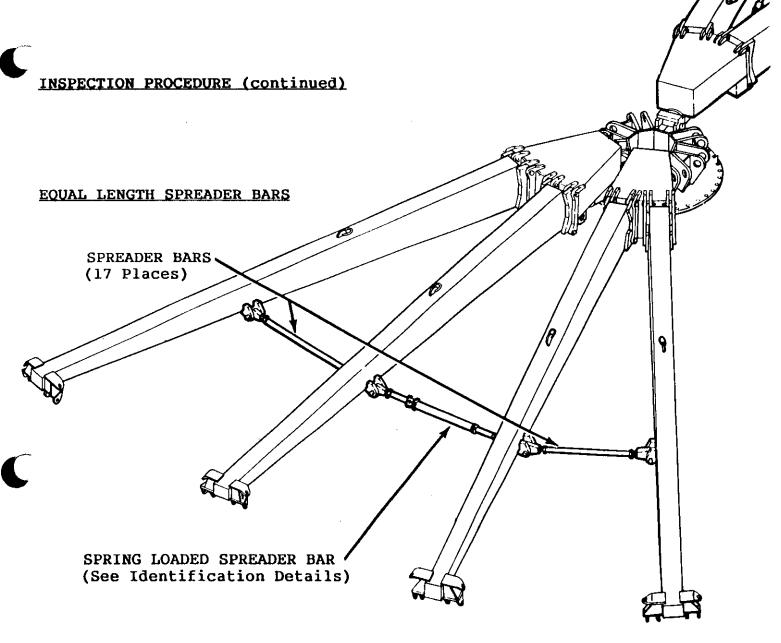
If your ride has <u>equal</u> length spreader bars and a spring-loaded spreader bar as shown in the illustration on the opposite page, you must replace the spring-loaded spreader bar. Order the following kit:

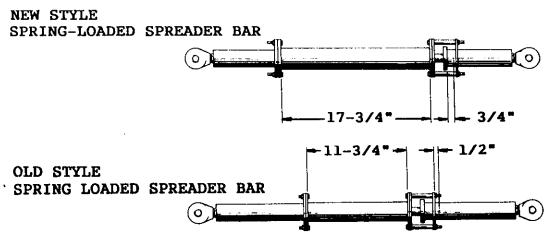
SPRING-LOADED SPREADER BAR REWORK KIT No. K37-0330-03 (consists of these parts necessary for one complete ride

PARTS LIST

<u>Item</u>	Part No.	Description			Q	ty.
1	376-0399700 376-7189900	SPRING SPREADER BAR ASSEMBLY (392-201A005)Spring Loaded Spreader Bar (392-210-001)	٠			1
_	237-0444200 691-4764600	Rod End				2
2 3 4	390-5230000 694-5190200 B392P1004-A	TAPER PIN - 3/4 x 5-11/16" (CSN10A05-07). HAIRPIN - 5/32" BULLETIN - Spreader Bar Instructions				2
-	DJJZKIOO4-A	popperin - peregger par instructions	•	•	•	

IMPORTANT: The new rod ends provided with the kit are of a new design and do not require bushings. DO NOT USE THE OLD ROD ENDS WITH THE NEW SPRING-LOADED SPREADER BAR. Discard the old rod ends.





INSPECTION PROCEDURE (continued)

UNEQUAL LENGTH SPREADER BARS

If your ride has <u>unequal</u> length spreader bars as shown in the above illustration, you must replace the entire spreader bar system. Order the following kit:

SPREADER BAR SYSTEM REWORK KIT No. K37-0330-04 (consists of these parts necessary for one complete ride

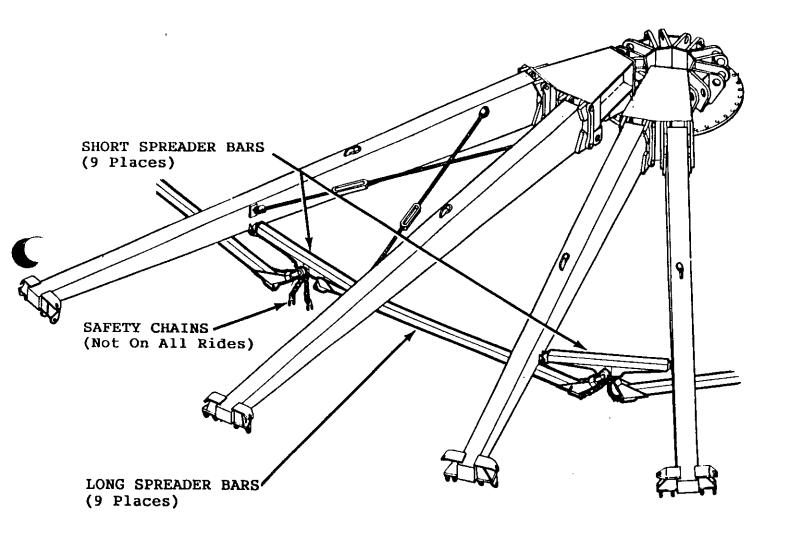
PARTS LIST

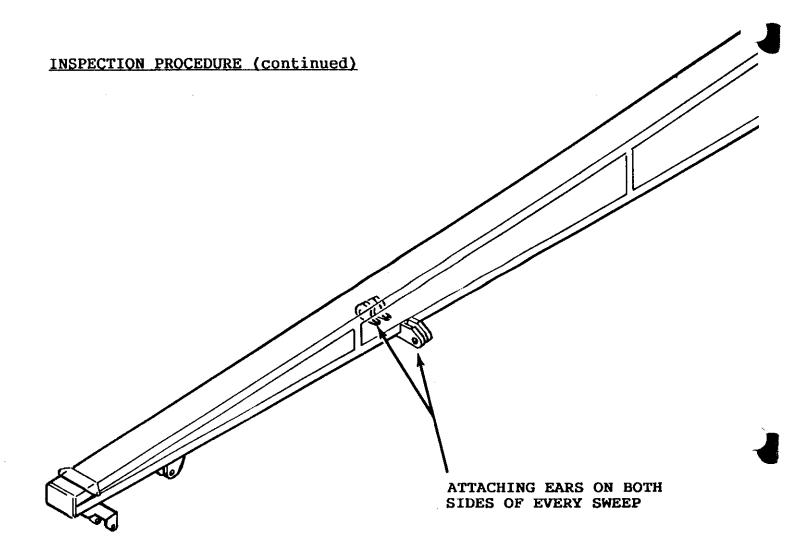
<u>Item</u>	Part No.	Description
1	376-0399600	SOLID SPREADER BAR ASSEMBLY (392-201A004) 17
	337-4162300	Spreader Bar (337-598-001) 1
	237-0444200	Rod End
	691-4764600	Jam Nut (1-1/4-12)
2	376-0399700	SPRING SPREADER BAR ASSEMBLY (392-201A005) 1
	376-7189900	Spring Loaded Spreader Bar (392-210-001) 1
	237-0444200	Pod Fnd
	691-4764600	Rod End
3	390-5230000	Jam Nut (1-1/4-12)
_		TAPER PIN - $3/4 \times 5-11/16$ (CSN10A05-07) 2
4	694-5190200	HAIRPIN 5/32"
5	B392R1004-A	BULLETIN - Spreader Bar Instructions 1

IMPORTANT: The new rod ends provided with the kit are of a new design and do not require bushings. DO NOT USE THE OLD ROD ENDS WITH THE NEW SPREADER BAR. Discard the old rod ends.

INSPECTION PROCEDURE (continued)

UNEQUAL LENGTH SPREADER BARS





If your ride does not have a spreader bar attaching ear on both sides of every sweep, you must install the remaining ears before replacing the spreader bar system. Order the following kit:

SPREADER BAR ATTACHING EAR KIT No. K37-0333-00 (consists of these parts necessary for one complete ride

PARTS LIST

<u>Item</u>	Part No.	Description		Oty
1 2 3 4	376-4237500	EAR AND BUSHING WELDMENT-R.H.(392-565-001) EAR AND BUSHING WELDMENT-L.H.(392-565-002) TOOL - Alignment (392-566-001) INSTALLATION INSTRUCTIONS	• •	9 1



Number: B392R1042-0

Date: July 12, 1989

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers: 86-53008 and 392-009-86 through 392-019-89

Ride: THUNDERBOLT Subject: Hydraulic Motor Mount Rework



WARNING: FAILURE TO COMPLY WITH THIS SERVICE BULLETIN CAN RESULT IN FAILURE OF THE DRIVE MOTOR, CAUSING THE RIDE TO STOP ABRUPTLY. THIS CAN RESULT IN INJURY TO PASSENGERS.

It has been determined by CHANCE RIDES, INC. that the hydraulic drive motor shaft can fail during operation. The motor mount and pinion gear have been redesigned to reduce the load on the motor shaft.

All owners of the above noted THUNDERBOLT amusement rides are required to perform the rework described in this bulletin.

Perform the rework using the instructions on the following pages of this bulletin. Order Kit No. K392R1042-0 and install the kit using the instructions provided. All work must be performed by qualified personnel, capable of understanding the function of the parts and their proper installation.

Return the attached Certification Of Compliance within 15 days from receipt of the bulletin. If there are any questions regarding the instructions or this rework, contact the CHANCE CUSTOMER SERVICE DEPARTMENT.

PARTS LIST - Kit No. K392R1042-0,
The following parts are included to rework on

Ref.	1110 10110	wing parts are included to rework one ride.	
	Part Number	Description	Qty. <u>Regđ.</u>
1. 2. 3. 4. 5. 6. 7. 8. 9.	34510300 34517006 34517007 34946300 64806900 33476502 33476503 60910600	*MOUNT ASSEMBLY (392-618-001) MOTOR MOUNT (392-615-001) MOUNT PLATE (392-616-001) PAD (392-621-003) LIFTING ADAPTER NUT - Pinion (1-1/2 - 12 Flexlock) HOSE - Hydraulic (392-650-001) HOSE - Hydraulic (392-650-002) CAPSCREW - Grade 5 (5/8-11 x 1-3/4)	. 1 . 1 . 4 . 1 . 1
40.	68552900	WASHER - Hardened (5/8)	. 8

^{*} For replacement parts for the motor mount assembly, refer to drawing on page 12 of this bulletin.

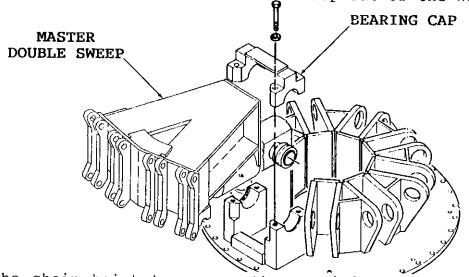


WARNING: The hydraulic motor and its mounting components are extremely heavy. To prevent personal injury, never attempt to remove or install any parts without a jack and blocking to adequately support the parts as they are lowered or raised.

REWORK INSTRUCTIONS

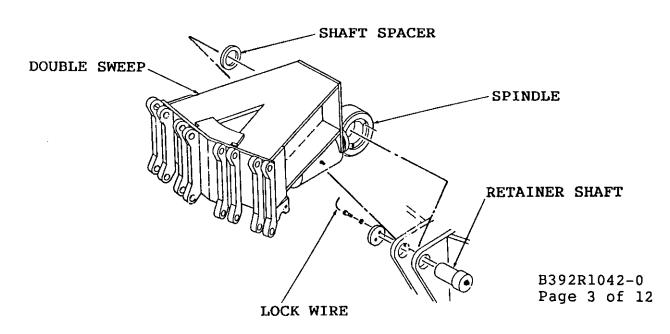
NOTE: This rework requires partial disassembly of the ride. Use the normal tear-down or set up procedures given in the CHANCE OPERATION & MAINTENANCE MANUAL when a partially disassembled ride configuration is required.

- Remove all cars and spreader bars from the ride. Use the chain hoist to remove all sweeps from the double sweeps.
- Use the chain hoist to support the master double sweep and remove the bearing caps. Move the double sweep out of the way.

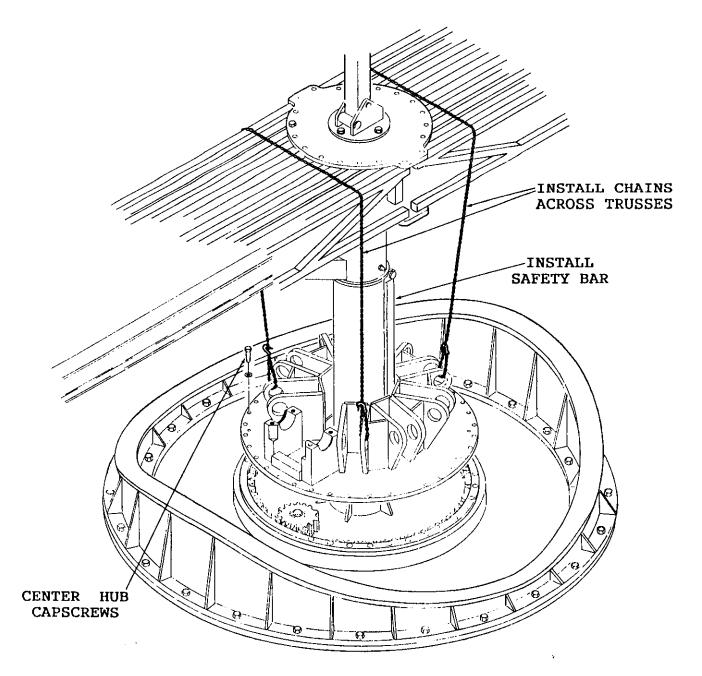


3. Use the chain hoist to remove the remaining double sweeps. Remove the sweep spindle retainer shafts and move the double sweeps out of the way.

IMPORTANT: Keep each retainer shaft with the sweep spindle from which it is removed. The double sweeps should be marked so that they are installed in their original positions.

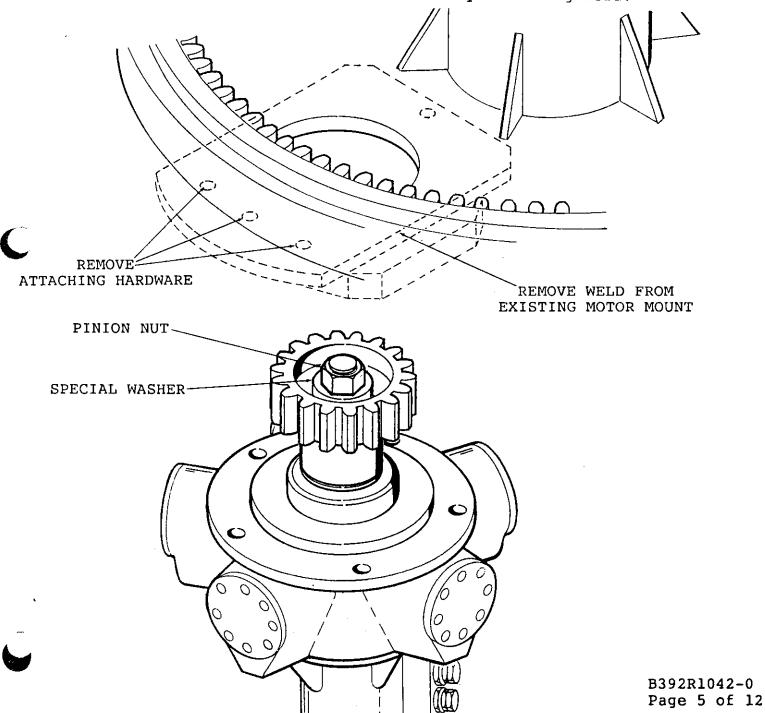


- 4. Remove the capscrews from the center hub.
- 5. With the center truss pole retracted, install chains across the trusses and attach to the center hub in four places as shown. Carefully raise the center pole, lifting the center hub. Install the safety bar.

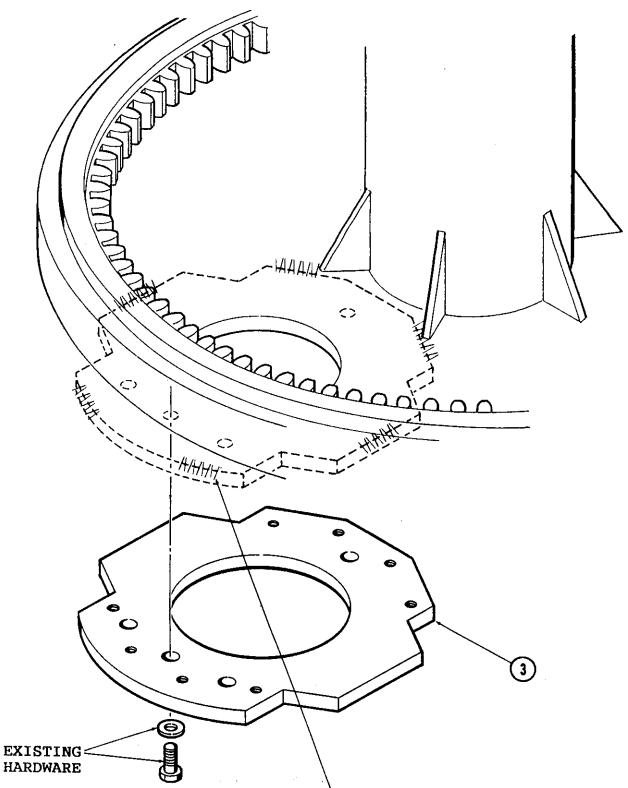


'6. Remove the plumbing from the hydraulic motor. Make note of which ports are connected by each hydraulic line. These lines will be replaced with new hoses.

- 7. Using a hydraulic jack and blocking under the hydraulic motor, remove the five capscrews which mount the motor. Lower and remove the motor.
- 8. Remove the pinion nut and special washer from the motor shaft. Use a suitable puller to remove the pinion gear from the motor shaft. Return the pinion gear to the factory. Discard the nut, but save the special washer and the key.
- 9. Use an air/arc to remove the weld between the existing motor mount and the hub. Remove the attaching hardware and remove the motor mount. Grind the surface to remove any remaining weld.



10. Install the new mount plate (Item #3) with the existing hardware, but do not tighten at this time.

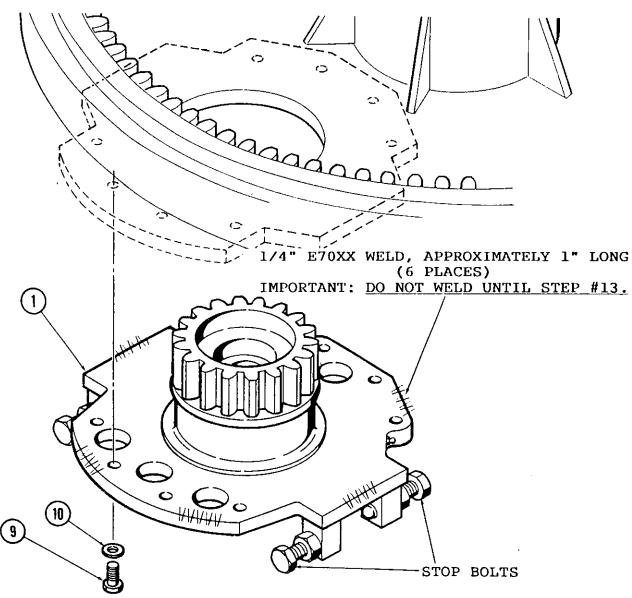


1/4" E70XX WELD, APPROXIMATELY 2" LONG (6 PLACES)

IMPORTANT: DO NOT WELD UNIT, STEP #13.

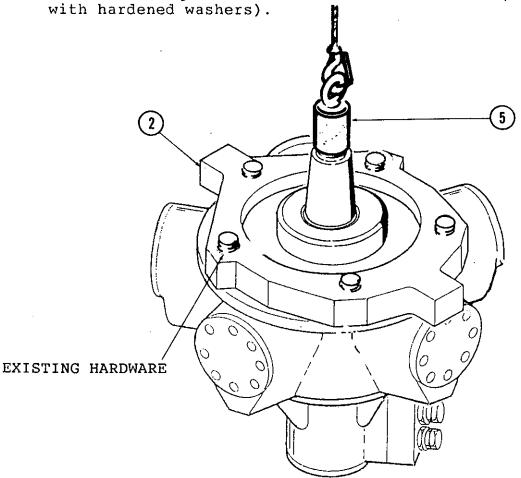
B**392**R1042-0 Page 6 of 12 11. Install the mount assembly (Item #1 to the mount plate using the capscrews and hardened washers (Items #9 and #10). Tighten the capscrews to 105 ft-lbs. (5/8-11 Grade 5 capscrews).

IMPORTANT: Loosen the jam nuts and turn all four stop bolts out until their spherical ends do not protrude.



- 12. Adjust the mesh of the pinion gear to the ring gear by moving the mount plate as required to obtain 0.005 inch of between the teeth.
- 13. When the correct adjustment is obtained, tighten the four bolts to 145 ft-lbs. (5/8-11 Grade 8 bolts with hardened washer). Weld the mount plate to the frame as shown in the illustration on page 6. Weld the housing of the mount assembly to the mount plate as shown in the illustration on this page.

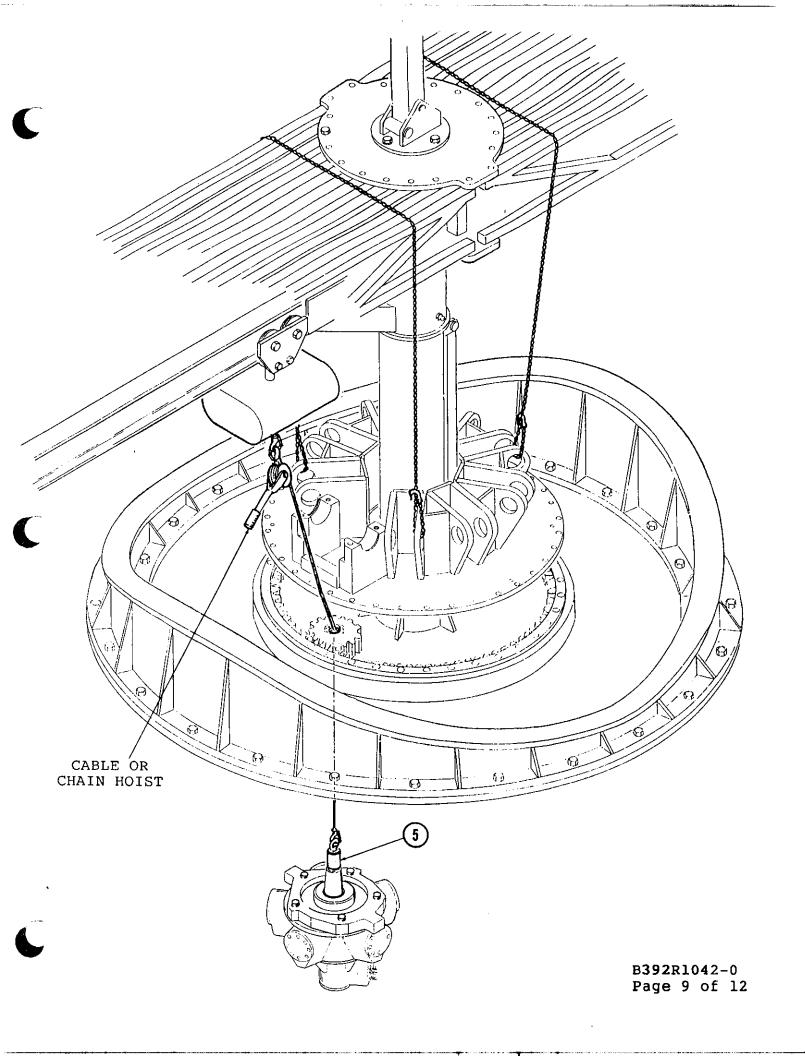
14. Install the motor mount (Item #2) on the motor using the existing hardware. Tighten the bolts to 185 ft-1bs. (3/4-10 Grade 5 bolts



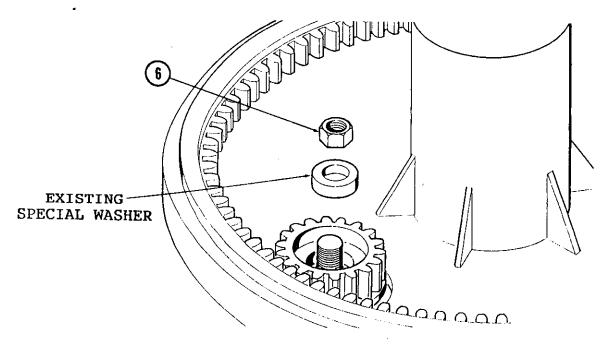
- 15. Install the existing key in the motor shaft keyway.
- 16. Install the lifting adapter (Item #5) on the hydraulic motor shaft. Attach a suitable cable or chain hoist to the lifting adapter, through the center of the pinion gear as shown on the following page.
- 17. Using the hoist in conjunction with the hydraulic jack, raise the motor into position. Make sure the key lines up with the keyway in the pinion.

NOTE: Do not attempt to raise the motor completely into position with the hoist. Raise it high enough that the lifting adapter can be removed and the special washer and pinion nut can be installed.

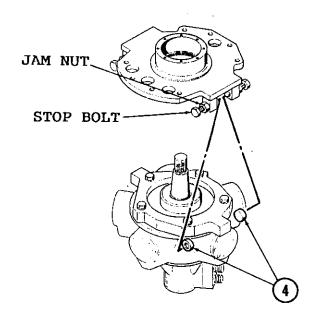
18. Make sure the motor is securely blocked from underneath and remove the lifting adapter.



19. Install the existing special washer and new pinion nut (Item #6)



20. Tighten the nut to 700 ft-lbs. As the nut is tightened, the motor will be drawn up into position.



21. Tighten the four stop bolts evenly, with a pad (Item #4) installed over the spherical end of each stop bolt. Tighten the stop bolts until snug, then tighten the jam nuts.

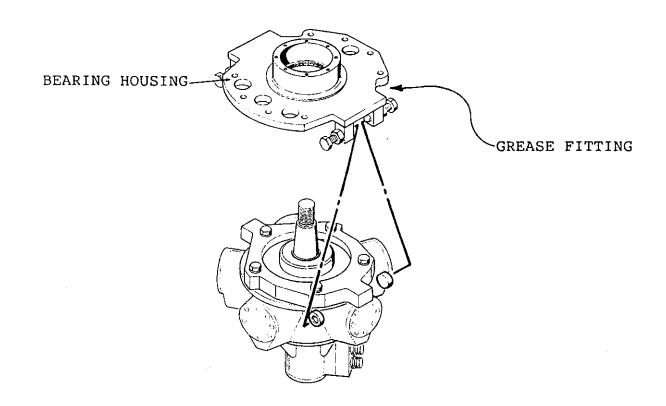
B392R1042-0 Page 10 of 12

- 22. Install the hydraulic hoses (Items #7 and #8).
- 23. Lower the center hub into position. Install the capscrews and washers and tighten to 105 ft-lbs. (5/8-11 Grade 8 capscrews with hardened washers).
- 24. Install all double sweeps except the master double sweep. Install the retainer shafts and tighten the capscrews to 105 ft-lbs. Install new lockwire in the capscrews.

NOTE: Install the shaft spacer on the side of the sweep spindle opposite the large end of the retainer shaft.

- 25. Install the master double sweep. Install the bearing caps, hardened washers and capscrews. Tighten the capscrews to 460 ft-lbs. (7/8-9 Grade 8 capscrews with hardened washers).
- 26. Install all sweeps on the double sweeps. Install and adjust the spreader bars as instructed in Service Bulletin B392R1004-A.
- 27. Complete the ride set-up procedure as described in the CHANCE OPERATION & MAINTENANCE MANUAL.

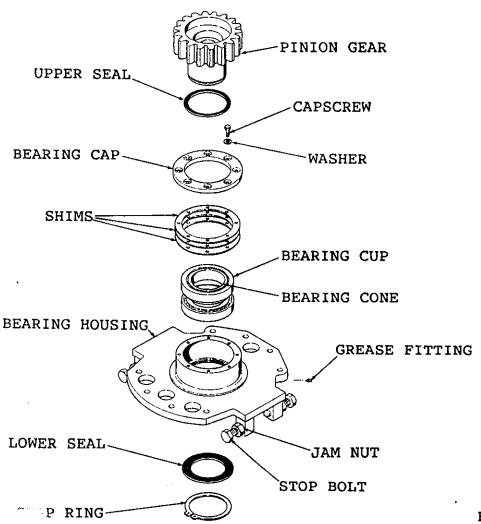
IMPORTANT: Thoroughly lubricate the bearings in the mount assembly through the grease fitting provided using No. 2 lithium base grease. The bearings must be lubricated at weekly intervals.



REPLACEMENT PARTS

The 34510300 MOUNT ASSEMBLY (392-618-001) consists of the following parts

	1
BEARING HOUSING (392-609-001)	1
#### #################################	
	_
	2
BEARING CONE	2
SNAP RING - External (4-1/4")	1
GREASE FITTING - 45° (1/4-28)	1
JAM NUT (7/8-9)	4
CAPSCREW - How Hood (2/8 16 v 1)	7
MAGNED THE REGULATION TO THE THEORY OF THE THE THEORY OF THE THE THEORY OF THE THEORY OF THE THEORY OF THE THE THEORY OF THE THE THE THEORY OF THE THEORY OF THE THEORY OF THE THEORY OF THE	8
washek - Hardened (3/8)	8
	PINION GEAR (392-624-001)BEARING HOUSING (392-609-001)STOP BOLT (392-621-004)SEAL - Upper (392-621-005)SEAL - Lower (392-621-002)BEARING CAP (392-621-001)SHIM - 0.003 (392-623-001)SHIM - 0.007 (392-623-002)SHIM - 0.015 (392-623-003)BEARING CUPBEARING CUPBEARING CONESNAP RING - External (4-1/4")GREASE FITTING - 45° (1/4-28)JAM NUT (7/8-9)CAPSCREW - Hex Head (3/8-16 x 1)WASHER - Hardened (3/8)



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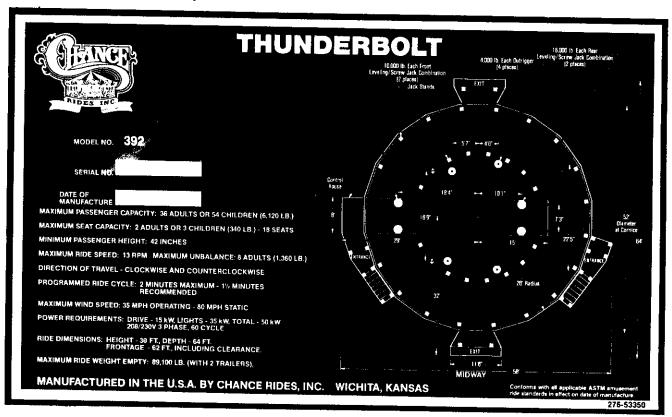
To The Owner

This manual is your guide to safe, productive operation. Read it carefully. It will help reduce trial and error learning and minimize damage and down time caused by improper maintenance.

For additional information, call the CHANCE CUSTOMER SERVICE DEPARTMENT.

Because we try to improve every Chance product, specifications and product design are subject to change without notice.

Ride Information Plaque



The ride information plaque is mounted to the bearing support tower.

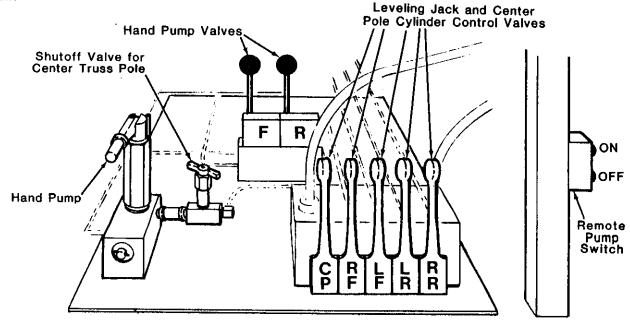
The plaque lists ride specifications, operating dimensions, ground loads, as well as model and serial number and date of manufacture.

When ordering parts, or requesting information from the CHANCE CUSTOMER SERVICE DEPARTMENT, always specify the model and serial number of your ride. Record this information in the spaces on the plaque shown.

NOTE: The terms "right hand" (RH) and "left hand" (LH) as used in this manual are determined by standing behind the main trailer, facing the trailer.

Set-Un Procedure - Hydraulic System Controls

Ride set-up is accomplished with the aid of the hydraulic system, powered by the electric motor. A valve directs oil to the four leveling jacks and the center truss pole lift cylinder. The controls are located on the trailer deck below the track.



Before starting to set up the ride, electrical power must be connected as follows:

- 1. Check the master circuit breaker located in the main control box. Make sure it is in the "OFF" position.
- 2. Ground the ride per local code.

IMPORTANT: Make sure the four small ground wires of the power cable are connected to an adequate ground per local code.

3. Connect the main electrical power supply to the ride. Check the electrical schematics for power requirements for the ride, noting the color coding of the power cable.

GROUND - GREEN WIRE

NEUTRAL - WHITE WIRE

3-PHASE-BLACK WIRE, RED WIRE, ORANGE WIRE

- 4. Make sure all switches in the control house are in the "OFF" position.
- 5. Turn the master circuit breaker "ON".

6. Turn the remote pump switch "ON". Check the direction of rotation. DO NOT OPERATE IF THE ELECTRIC MOTOR IS RUNNING IN THE WRONG DIRECTION.

NOTE: Arrows on the pump housing indicate correct direction of rotation.

Check the following before operating the leveling jack controls:

Shutoff valves directly below hydraulic controls (4).....OPEN

Pull each leveling jack control valve lever to extend the jack; push on the lever to retract the jack. The center truss pole lift cylinder operates similarly.

MANUAL OPERATION

When electrical power is not available, a hand pump is provided to operate the leveling jacks and the center pole lift cylinder. This feature can be used to raise the trailer off the tractor, or to start set-up of the ride.

Check the following before manually operating the hydraulic system:

Leveling jack and center......CLOSED
pole cylinder control (in the center
Valves (5) position) Do
not use these
valves during
manual operation

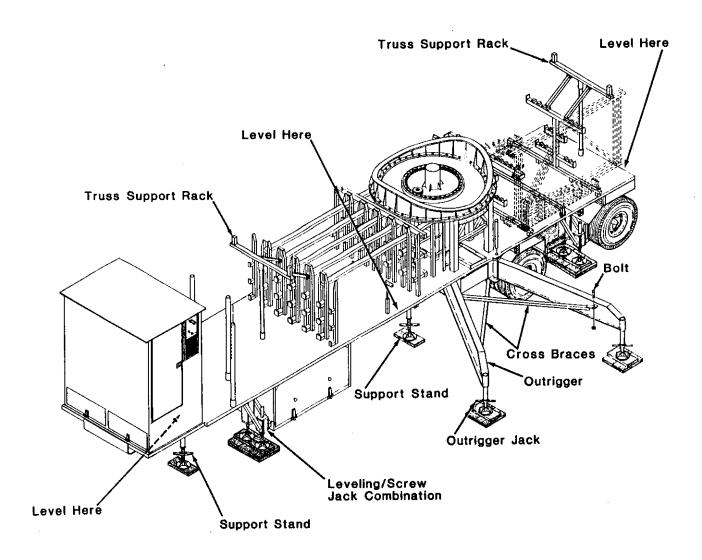
Shutoff valve for......OPEN while center truss pole raising center truss pole - CLOSED for operation of leveling jacks

Shutoff valves at leveling jacks (4).....OPEN

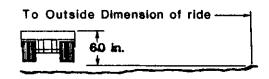
NOTE: When operating the hydraulic system manually, both front jacks, or both rear jacks will extend or retract simultaneously. Use the shutoff valves at the leveling jacks to control either the left or right hand jack individually.

Hand pump valves....Pull the lever on the hand pump valve to extend the jacks on either the front or rear. Push the lever to retract the leveling jacks.

Set-Up Procedure - Trailer



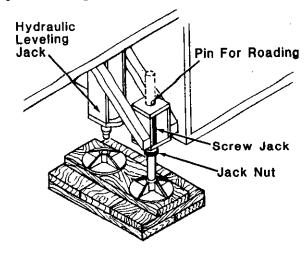
1. Refer to the operating dimensions on the ride information plaque. Locate the main ride trailer in position.



NOTE: There must be at least 60 inches from the top of the trailer to the highest level of ground as shown. Level trailer accordingly.

- 2. Place good, solid blocking, preferably wooden 3 x 12's, under the four leveling/screw jack combinations. Refer to the drawing for approximate placement. As blocks are stacked, criss-cross each layer. Position the jack pads under the jacks.
- 3. Raise the front of the trailer high enough to remove the tractor, using the hydraulic leveling jacks.
- 4. Level the rear of the trailer with the leveling jacks. Use a bubble level on the leveling pads just below the tail lights.
- 5. Use the bubble level on the main stringers and raise the front of the trailer level with the back and level from side to side.

6. Lower the screw jacks and tighten the jack nuts by hand.



IMPORTANT: The hydraulic leveling jacks are for leveling only, and cannot be expected to maintain their position during operation. Be sure that all four screw jacks are on solid blocking and the jack nuts are tightened. Retract the hydraulic leveling jacks so the entire weight of the ride is on the screw jacks.

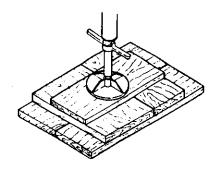
Shutoff valves for each leveling jack are located directly below the leveling controls. These valves are to be closed to help prevent leak-down of the leveling jacks if there is a delay during set-up. Normally the valves are open for set-up and operation.

NOTE: During the tear-down procedure, extend the hydraulic jacks slightly to take the load off the screw jacks for loosening the jack nuts.

7. Remove the roading pins from the outriggers and swing them into position.

8. Install the cross braces from the outriggers to the trailer frame. These are secured by 3/4-inch bolts and nuts.

9. Install jacks in outrigger sockets and lock with pin. Block as required under the outrigger jacks.

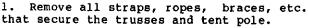


10. Tighten the outrigger jacks snug on both sides of the trailer.

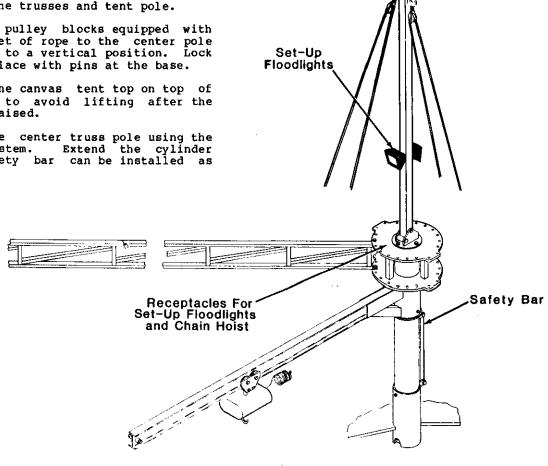
IMPORTANT: The outrigger jacks must be tightened evenly on both sides of the trailer to avoid twisting the trailer.

11. Install the support stands under the midsection of the trailer and under the control house. Block as required. Tighten the support stands.

Set-Up Procedure - Center Pole, Trusses and Sweeps



- Attach pulley blocks equipped with about 30 feet of rope to the center pole and raise it to a vertical position. Lock the pole in place with pins at the base.
- Place the canvas tent top on top of the trusses to avoid lifting after the trusses are raised.
- 4. Raise the center truss pole using the hydraulic system. Extend the cylinder until the safety bar can be installed as shown.





WARNING: Do not allow personnel up around sweep hub until safety bar is installed.

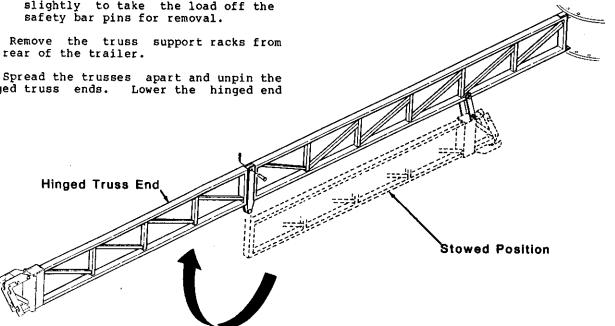
NOTE: During the tear-down procedure, the center truss pole must be raised slightly to take the load off the safety bar pins for removal.

the rear of the trailer.

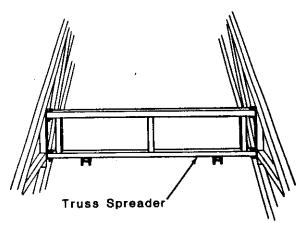
6. Spread the trusses apart and unpin the hinged truss ends. Lower the hinged end carefully using the lifting pole support them.

NOTE: The lifting pole is stored on the main trailer.

Raise the hinged truss ends into position and secure with pins.



8. Swing the truss spreaders into position and pin in place.

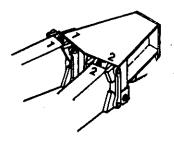


- 9. Remove the chains, cross bars and vertical posts that rack the floor sections and sweeps.
- 10. Hang the portable chain hoist on its trolley. The hoist plugs into a receptacle on the top of the truss hub.
- 11. Turn on the "FLOOD LIGHTS" switch in the control house to provide electrical power to the chain hoist.

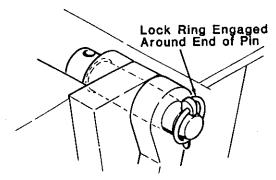
IMPORTANT: BEFORE INSTALLING THE SWEEPS,
ALL FLOOR STANDS MUST BE
REMOVED FROM THE MAIN
TRAILER. THE STANDS CAN
EITHER BE MOVED OUT OF THE
WAY TO THEIR APPROXIMATE
LOCATIONS, OR IF PREFERRED,
INSTALL THE FLOOR STANDS AND
FLOORS BEFORE COMPLETING THE
SWEEP INSTALLATION. Refer to
"Set-Up Procedure - Floors".

- 12. Attach the hoist hook to the ring on top of the sweep. Raise the sweep and gently swing it over to the side.
- 13. Raise or lower the sweep until the hub end is level with the ears on the center hub.

IMPORTANT: The first two sweeps are installed on the master drive sweep. The sweeps and drive sweeps (double sweeps) are numbered. THE NUMBER ON EACH SWEEP MUST MATCH THE NUMBER ON THE DRIVE SWEEP ON WHICH IT IS INSTALLED.



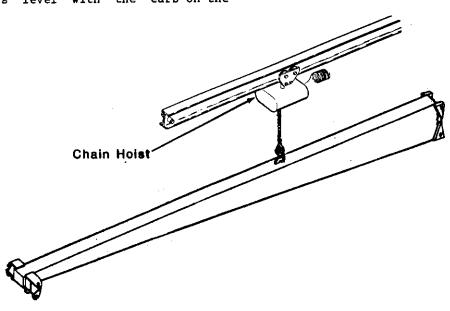
- 14. Guide the sweep in between the ears on the master sweep, matching the numbers. Install the lower pins and lynch pins.
- 15. Raise the sweep until the top holes align. Install the pins and lynch pins.

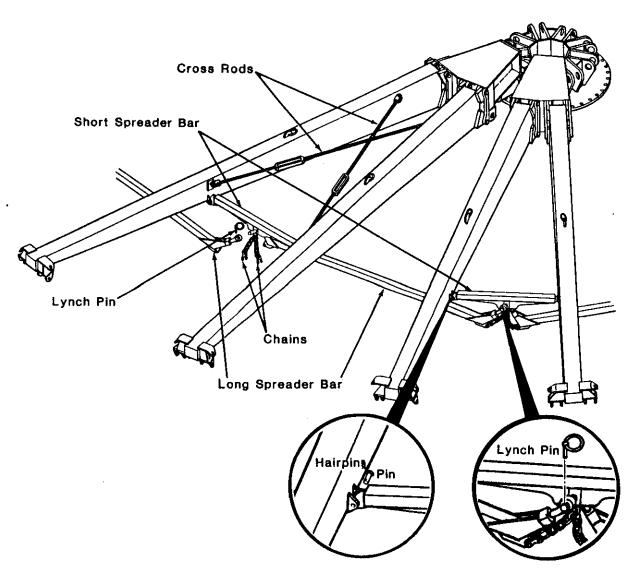


IMPORTANT: The lynch pins must be installed as shown with the lock ring fully around the pin.

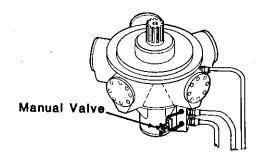
16. Repeat Steps 12 through 15 for the second sweep.

WARNING: Do not substitute any other pins in place of lynch pins or sweep pins.





- 17. Remove the spreader bars from the rack. Install a short spreader bar between the sweeps with the pins pointed COUNTERCLOCKWISE (pointed in direction of forward ride rotation).
- 18. Install cross rods on the first two sweeps. These are the only cross rods, and must be installed properly.
- 19. Open the manual valve on the hydraulic motor enough to allow the sweeps to be turned by hand, then close the valve so that the next two sweeps can be hung.



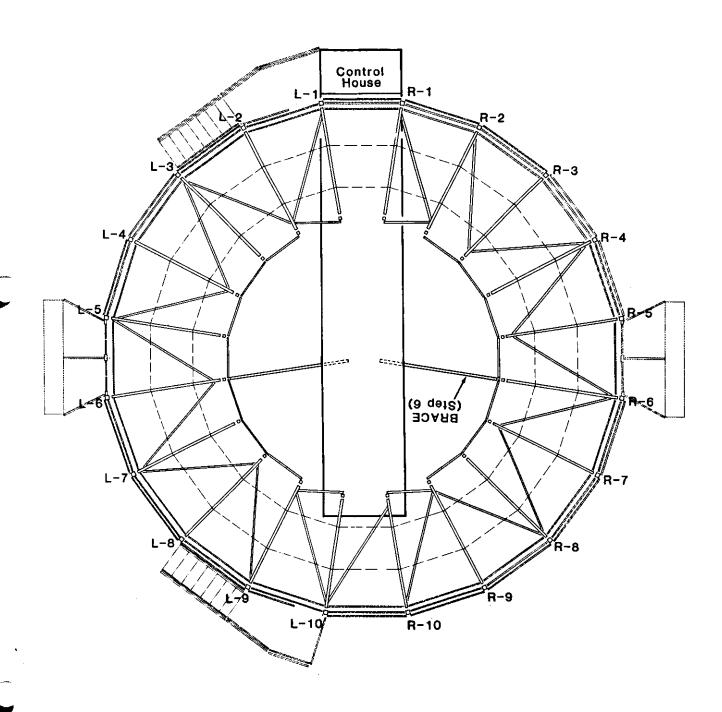
- 20. Hang the next two sweeps, making sure the numbers match.
- 21. Install the short spreader bar between those two sweeps.
- 22. Install the long spreader bar from inside one short spreader bar to the outside of the next short spreader bar as shown. Make sure the lynch pin is installed pointing down, and that it is locked in place.
- 23. Install the chains at each end of the long spreader bar. Be sure the chain is not twisted.
- 24. Continue rotating the hub by hand, installing two sweeps at a time, then the spreader bars as described in previous steps.
- 25. Make sure the manual valve on the motor is closed.

Set-Up Procedure - Floors

NOTE: During the initial set-up of each ride at the factory, all of the floor stands, supports, and floor sections are numbered. The numbering sequence starts at the control house, and proceeds to the right and to the left. The markings are R-1, R-2, R-3; or L-1, L-2, L-3, etc. The number corresponds to the position of the floor stand and whether it goes to

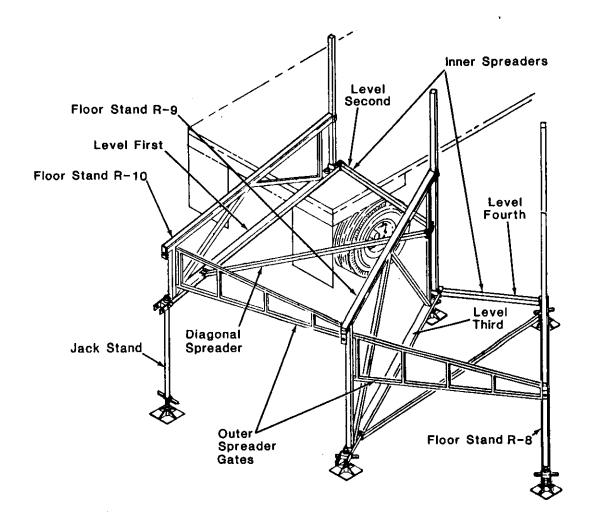
the left or right of the control house.

The numbers are written with an ink marker, and will eventually deteriorate. Maintain these numbers so they remain legible. Many ride owners permanently number these parts with a small bead of weld.



1. Lay each floor stand around the ride in the approximate position in which it will be set up. If the stand is not numbered where it can be readily seen, the number will be marked on the outer end.

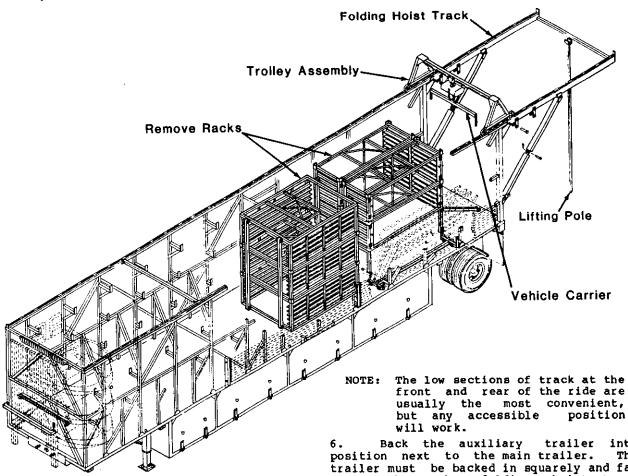
NOTE: All of the floor stands, supports, and floor sections rack on the main trailer.



- Install floor stand R-10 over the positioning pegs on the trailer. Level it using jack stand and blocking as required.
- 3. Install the inner spreader bar, outer spreader gate and floor stand R-9. Level the inner spreader, then the floor stand R-9, using blocking as required at the jackstands.
- 4. Install the diagonal spreader. Recheck level at inner spreader and floor stands.
- 5. Repeat Steps 3 and 4 for floor stands R-8, R-7, and R-6.
- 6. Install the brace from underneath the trailer midsection to floor stand R-6.
- 7. Continue setting floor stands R-5, R-4, R-3 and R-2. Floor stand R-1 cannot be installed until the floor sections are moved from their racked position on the trailer.
- 8. Repeat the set-up procedure on the left hand side of the trailer. (Floor stands L-10 through L-2). These floor stands and supports are similar to but not interchangeable with those on the right hand side.

- 9. Install all inner posts. They are marked to match the floor stands.
- 10. The floor sections are marked to match the floor stands. Install all inner floor sections first (except those at floor stands R-l and L-l, which are not installed yet), then middle floor sections, and finally outer floor sections.
- 11. Install floor stands R-1 and L-1.
- IMPORTANT: Floor stands R-1 and L-1 must mate with adjoining floor stands or the trailer deck when level. If not, recheck ALL floor stands to locate which ones are not level. Do not force out-of-level floor stands or supports into place.
- 12. Complete the installation of the floor around R-1 and L-1.

Set-Up Procedure - Vehicle Installation



WARNING: Before starting the next phase of set-up, read the instructions in the "Operation" section of this manual. Do not operate the ride until you are all familiar with of the controls.

 Start the ride and check rotation, forward and reverse speed, and braking. If the ride operates correctly, proceed to the next step. If not, locate and correct the problem.



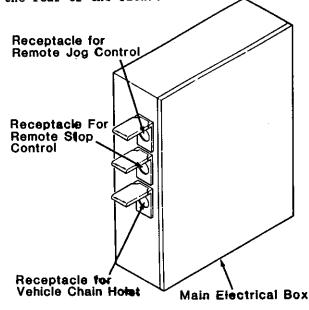
WARNING: Before operating the make sure there are no personnel inside the floor area or on the ride structure.

- 2. Raise the folding hoist track and pin the braces.
- Attach the chain hoist to the trolley cord to the and connect the power receptacle in the main electrical box.
- Use the chain hoist to remove all 4 . scenery racks from the auxiliary trailer.
- 5. Remove the pins from at least three truss spreaders to allow two trusses to swing clear of the vehicle installation area.

Back the auxiliary trailer into trailer must be backed in squarely and far enough that the folding hoist track extends over the sweep ends.

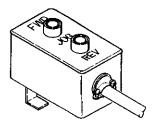
NOTE: If desired, the inner panels and outer posts can be installed before the vehicles are installed (See "Set-Up - Final"). Remember to leave at least one section open to allow clearance for the auxiliary trailer hoist trolley.

Roll the trolley assembly back over the first vehicle (the upper vehicle at the rear of the rack).

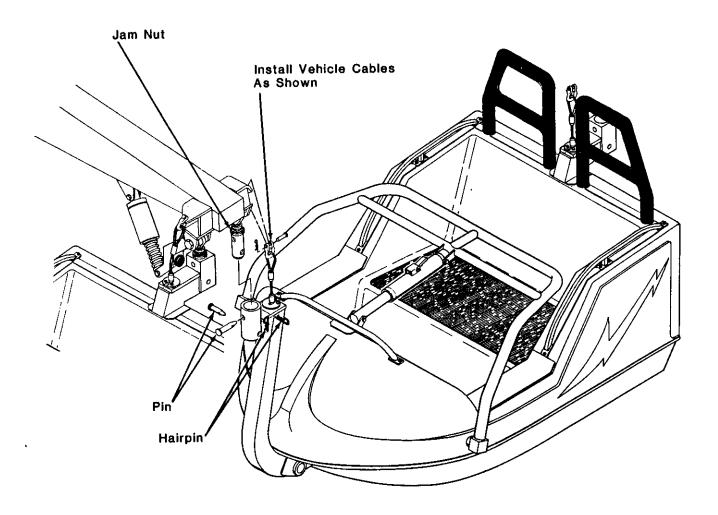


- 8. Secure the vehicle carrier to the hoist chain.
- 9. Place the vehicle carrier under the front and rear of the vehicle. Remove the pins which secure the vehicle to the trailer. Gently lift the vehicle.
- 10. Roll the trolley toward the sweep.
- ll. Make sure the vehicle points in a clockwise direction.
- 12. Using the chain hoist, align the rear vehicle socket with the rear hanger. Install the pins and hairpins as shown. Raise the vehicle to install the front hanger.
- 13. Tighten the jam nuts on front and rear hangers.
- 14. Install the vehicle cables as shown.

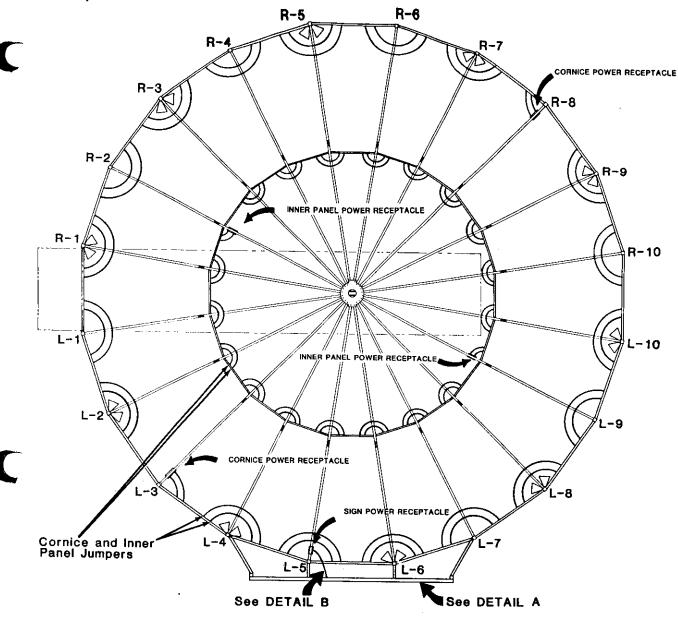
15. Use the remote jog control to rotate the ride. Skip one set of sweeps, and install a vehicle on the next, by repeating Steps 7 through 13.



- 16. Continue installing vehicles on every other sweep.
- 17. When all vehicles are loaded, remove the auxiliary trailer.
- 18. Install the truss spreaders which were left open to allow vehicle loading.

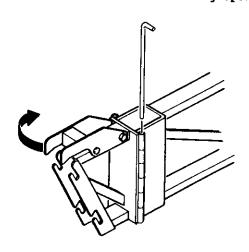


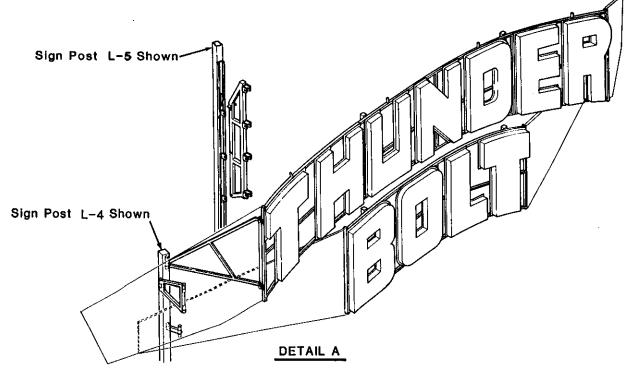
Set-Up Procedure - Final

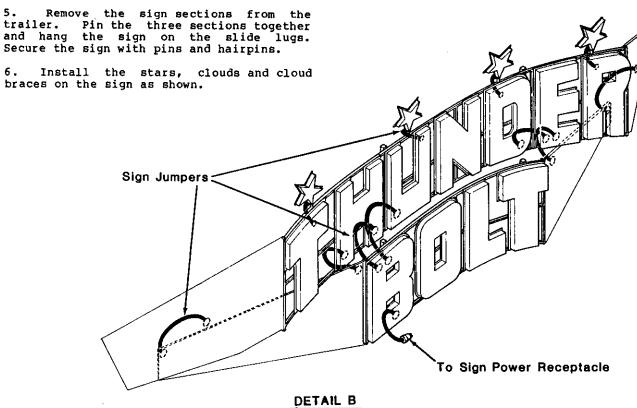


- 1. Remove the sign posts L-4, L-5, L-6, and L-7 from the trailer. Secure the winches to the posts L-5 and L-6. Thread the cable over the pulleys to about four feet from the base.
- Pin the posts at the base to the floor stands. Lift the posts to upright position.
- 3. Position a man on top of each of trusses L-4, L-5, L-6, and L-7.

4. Swing open the truss ends. Position posts in channels on trusses and pin in place. Leave the truss ends swung open.



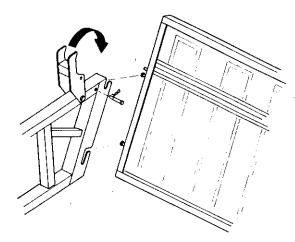




- 7. Install the jumpers to the sign and clouds as shown.
- 8. Raise the sign slowly, making sure the sign remains level. If it is not kept level, the slides will bind in the posts.
- 9. When sign is fully raised, install pins through the posts and slides.
- 10. Secure the cloud braces to the posts.

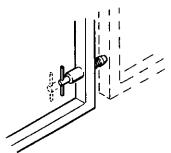
- 11. Swing truss ends closed and secure
 with "L"-shaped pin.
- 12. Plug the sign into the receptacle on post L-5.
- 13. Remove the winches from the sign posts. Store them under the floor behind the post, letting the cable lay against the pole.
- 14. Install the remaining outer posts.
- 15. With two men at the top of adjacent trusses, toss each of them a rope with a hook attached.
- 16. Remove a cornice from the auxiliary trailer rack and secure it to the ropes.

NOTE: All cornices are interchangeable.

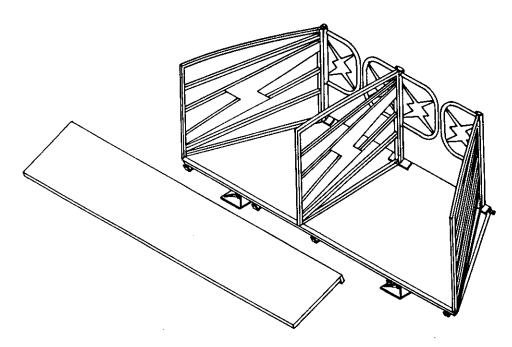


17. Pull the cornice up and hook on the truss ends. Swing down the cornice lock and pin the cornice lock in place.

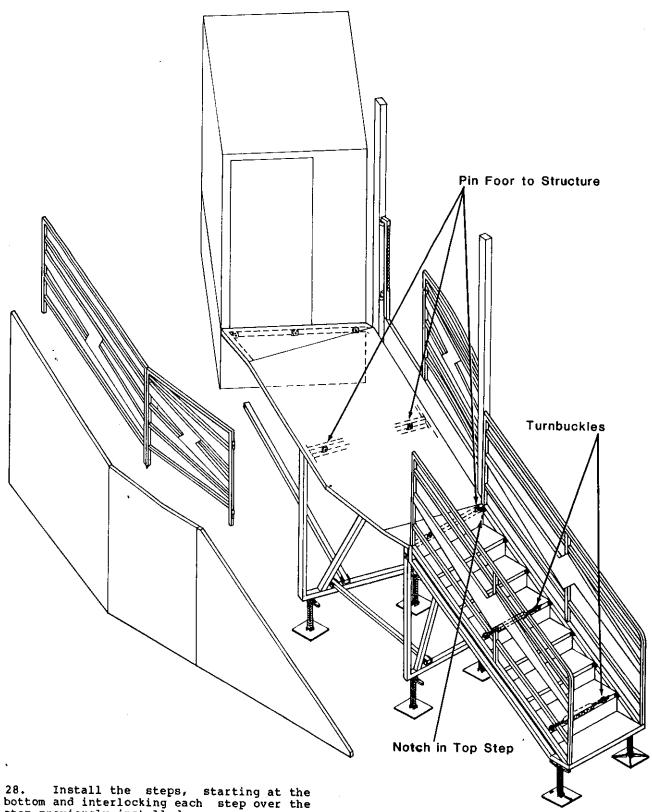
- 18. As cornices are installed, complete the electrical connections using the jumpers from cornice to cornice as shown. The connections to the trusses L-3 and R-8 are also shown.
- 19. At this point, the canvas tent top can be installed. However, it can be installed later if so desired. Refer to "Tent Top Installation" at the end of this section.
- 20. Install the upper inner panels to the truss spreaders.
- 21. As the upper inner panels are installed, complete the electrical connections using the jumpers from panel to panel as shown. The connections to trusses L-9 and R-2 are also shown.
- 22. Hang the lower inner panels between the inner posts.



- 23. Install the outer panels. Insert the fixed pin end of the panel in the post. Swing the panel inward with a man on the inside to release the spring-loaded pins.
- 24. Install the fences around the track.
- 25. Install the exit ramps as shown, using blocking and the jackstands to level them as required.
- 26. Install the fences and gates on the exit ramps.



27. Install the floor and step supporting structure for the entrances as shown. Level as required using blocking and jackstands as required.



step previously installed.

NOTE: The steps are interchangeable except for the top step which is notched as shown.

29. Install the turnbuckles and tighten.

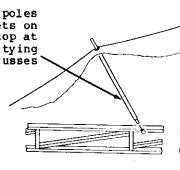
30. Install the entrance floor and $% \left(1\right) =\left(1\right) +\left(1\right)$

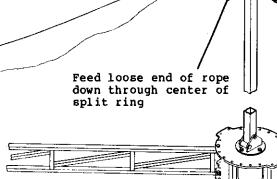
31. Install the entrance fences and lower panels. Install the panel clips between panels at the bottom of each panel joint.

Tent Top Installation

- 1. There are four slots near the edge of the canvas. Locate these slots without spreading the canvas out any more than necessary.
- 2. Position the canvas so the slots fit around the four sign posts.
- 3. Lace the canvas around the sign posts.

Install the quarter poles for the top in sockets on trusses. Secure top at quarter poles by tying ropes provided to trusses





- 4. Fasten the split ring together around the center pole, by inserting eyebolts through the halves.
- 5. Tie the ropes from the pulley blocks to the eyebolts. Feed the loose ends of the ropes down through the center of the split ring so it is on the underneath side of the canvas.
- 6. Lace the two canvas top halves together as shown.

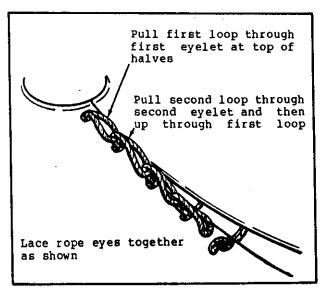
IMPORTANT: If set-up floodlights are installed on the tent pole, remove them before hoisting

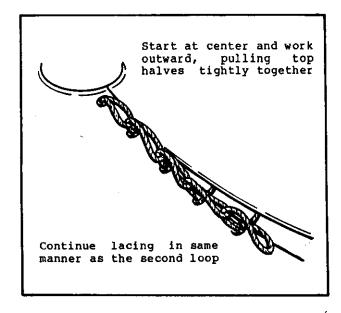
the canvas.

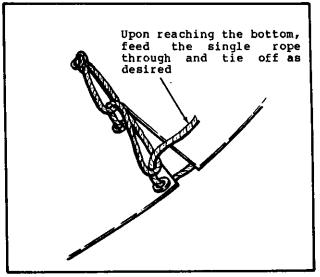


CAUTION: Do not let loose ends of the ropes hang down where they can get caught on moving parts or where passengers can reach them.

7. Hoist the canvas up. Tie the ropes off to the trusses. Secure the top around the edges by hooking the loops to the eyes on the cornices.







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OPERATION

3-1

Operator Selection and Instruction

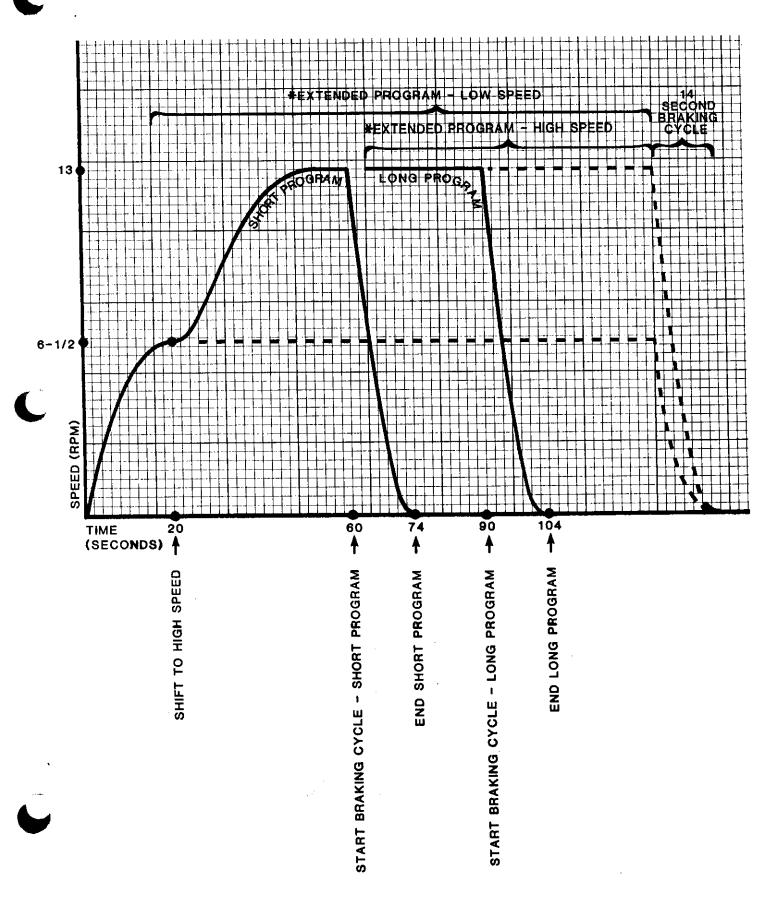
- Select competent mature operators, capable of understanding the function, use and control of amusement rides.
- 2. Instruct each operator fully in the proper use and function of the ride he is to supervise, including:
 - Controls and procedures for normal and emergency operation.
 - Manufacturer's recommended maximum speed and load.
 - c. Manufacturer's recommended length of ride time and frequency of repeat rides.
 - d. Any foreseeable misuse of the ride as determined by the manufacturer or owner, or by special conditions such as weather, location or crowds.
 - e. Each operator must have immediate availability of a manufacturer's operator's manual for the ride he supervises.
- 3. Require each operator to inspect the ride he supervises before each day of operation.
 - a. Determine that no portion of the ride is damaged, missing, or worn in such a manner that it is unsafe or that can develop into an unsafe condition.
 - b. Report any irregularities to superintendent or owner.
 - c. Do not operate the ride if any irregularities are found until such condition is corrected.
- 4. Instruct the operator to allow no passenger to ride who is visably ill, under the influence of drugs or alcohol, or pregnant.
- 5. Instruct operators and attendants on the proper methods of securing passengers in the ride. Do not allow a passenger in the ride that cannot be properly secured due to passenger size or malfunction of the securing device. Stop the ride immediately if any passenger is observed tampering with any restraining device or behaving dangerously, such as standing up.

- 6. Advise the operator against starting or operating the ride while any person (passenger, spectator or employee), is in an endangered or unsafe position on the ride or within the ride area.
- 7. Insist that each operator remain in full control of the operating controls during operation of the ride, and give his full attention to the ride and its passengers.
- 8. Instruct the operator to allow no other person, other than another trained operator, to operate the controls of the ride, excepting portions of the ride that are designed to be controlled by the passenger.
- 9. Instruct the operator and attendants fully as to the proper method of assembly and disassembly of portable rides and supply adequate personnel and equipment to do it safely.

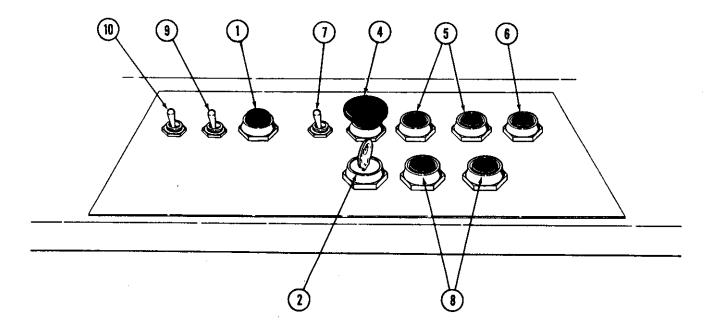
Do not allow spectators in the area.

- 10. Instruct the operator to inspect and correct or replace damaged, lost or worn parts that are unsafe or that can develop into unsafe parts, during assembly or disassembly.
- 11. Advise the operator that factory-installed safety devices must not be tampered with or removed.
- 12. Advise the operator of owner/supervisor procedure for assisting ill or injured passengers.
- 13. Instruct operators and attendants that patrons are required to secure all articles, such as keys, change, eye glasses, etc., which may become loose while riding.

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Operator's Console



1. POWER BUTTON - This button shuts off all electrical power to the ride by tripping the main circuit breakers. Push this button only under the following circumstances:

-In case of fire or electrical emergency;

-When shutting down the ride at the end of a day's operation.

NOTE: To restart the ride, turn all switches and controls "OFF", then turn on the main circuit breakers in the main control box.

2. KEY SWITCH - Use the key switch to select either the "SHORT" ride program or the "LONG" ride program.

NOTE: Do not change the position of the key switch after the ride is started.

3. FOOT SWITCH (NOT SHOWN) - The foot switch is located directly below the ride operating controls. This switch must be depressed to operate the FORWARD or REVERSE buttons, or either JOG button. If the foot switch is released, the program is interrupted and the ride will brake to a stop.

4. STOP BUTTON - This button interrupts the programmed drive. The ride will brake to a stop.

5. FORWARD and REVERSE BUTTONS - These buttons start the ride in the desired direction: FORWARD (clockwise) or REVERSE (counterclockwise).

IMPORTANT: The foot switch must be depressed before operating either the FORWARD or REVERSE buttons.

Once the button is pushed, the program automatically controls ride speed, the length of the ride (depending on which program has been selected), and braking.

IMPORTANT: Stop the ride completely before changing the direction of rotation.

NOTE: The ride program can be extended in either the fast or slow speed mode, depending on when the button is pressed.

6. EXTEND PROGRAM BUTTON - After the ride starts, hold this button down to extend the length of the ride cycle. The ride time will be increased by the same length of time as the button is held down. As soon as the button is released, the ride will automatically slow and brake to a stop.

7. PUMP SWITCH - This switch controls the hydraulic pump. The switch must be off whenever the operator must leave the control house.

IMPORTANT: Never stop the ride by shutting off the pump.

NOTE: Shutting off the pump between ride cycles is not recommended.

8. JOG FORWARD (clockwise) and JOG REVERSE (counterclockwise) BUTTONS - The jog feature allows the operator to rotate the ride to any position, for erecting the ride or loading passengers. The jog feature operates only when the foot switch is depressed.

9. FLOOD LIGHTS SWITCH - This switch controls the flood lights on the outer posts.

10. HOUSE LIGHT SWITCH - This switch controls the lights inside the control house.

Safety Equipment

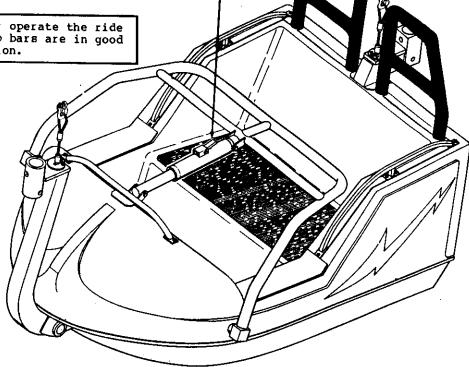
LAP BARS

The ride is equipped with locking lap bars. Inspect and test all lap bars before each day of operation. Any loose, broken or missing parts must be repaired or replaced immediately. Do not tamper with or attempt to defeat the purpose of the lap bars.

CAUTION: Never operate the ride unless ALL lap bars are in good working condition.

Push the release lever on the lap bar lock and raise the lap bar.

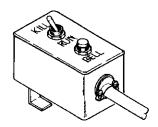
After passengers are seated, push each lap bar down and check to be sure that the lap bar lock has engaged.



Release Lever

REMOTE STOP SWITCH

During normal operation, there must be two operators--one in the control house and one platform operator on the entrance on the opposite side of the ride.



The platform operator uses the remote stop This control has an "ON/OFF" or control. "STOP" switch and a "BELL" button.

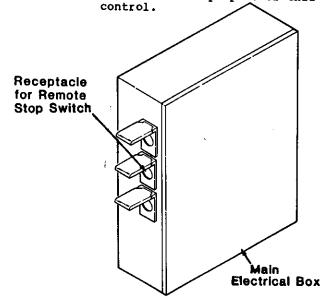
In an emergency, the platform operator can shut down the ride with the stop switch, or can signal the operator in the control house with the bell that there is a problem and to shut down the ride.

The bell can also be used to signal the control house operator that all passengers are safely loaded and it is clear to operate the ride.

IMPORTANT: Establish a standard set of signals between the control house and platform operators. Various conditions before and during the ride operation must be communicated accurately for safe, efficient operation.

As a safety precaution, always turn the remote stop switch "OFF" while passengers are loading or unloading. When all passengers are safely loaded, use the bell to signal the control house operator, then turn the switch to "ON". The ride can then be operated from the control house.

The remote stop control must be connected to the main IMPORTANT: electrical box to complete the circuit for ride operation. Do not tamper with or attempt to defeat the purpose of this



Loading



CAUTION: Do not allow any passenger on the ride who cannot be properly secured because of passenger size or condition.

Never allow a pregnant woman or a passenger who is visibly ill or under the influence of drugs or alcohol on the ride.

If the ride is being operated at less than its full passenger capacity, direct the passengers to seats around the ride to balance the load. Never operate the ride with an imbalance of more than eight adults on any one side of the ride.

Operating the Ride



CAUTION: Before starting the ride, make sure there are no people around the ride structure, between the vehicles, close to any exposed electrical components, or any other area where there is a possibility of personal injury.



CAUTION: Both operators must remain in full control of the operating controls at all times during operation of the ride. The ride and its passengers must be given the FULL attention of the operators.

Never leave the operating controls while the ride is in operation.

- Turn on the main circuit breaker on the power unit.
- 2. Turn on the pump and lights.
- Raise each lap bar, load the passengers and lower the lap bar. Check each lap bar to make sure it is down and locked.
- 4. When all passengers are safely loaded and the platform operator has signalled, depress the foot switch and the "FORWARD" or "REVERSE" button to start the ride.
- 5. The ride cycle is pre-programmed and will stop automatically when the cycle is completed. Keep your foot on the foot switch.
- 6. When the ride cycle is completed and the vehicles are stopped, release the lap bars and allow the passengers to exit.

4-1

Preventive Maintenance

Preventive maintenance is the easiest and most economical means of assuring many satisfactory, productive hours of operation. Properly scheduled maintenance is the key to lower operating costs and longer service life for your ride.

Intervals have been established for servicing the ride. These intervals are based on the number of days the ride has run.

The items listed in this section are separated into maximum intervals. These intervals are based on "average" operating conditions. Actual conditions under which your ride is operated are the determining factors when setting up a maintenance schedule. When operating under "severe" conditions, such as excessive heat, cold, dust, mud, water, or salt sea air, more frequent servicing is necessary.

Maintenance - First Week of Operation

The ride has been completely serviced and tested before leaving the factory. However, during the first week of operation and after each set-up, the ride operator must be especially observant and watch for loose bolts, leaks, etc.

In addition, to regular scheduled maintenance, check the following:

 Check the torque of all functional load carrying capscrews after the first week of operation and after each set-up. This allows for initial seating of components. Check torque at monthly intervals thereafter except where a shorter interval is specified in this manual.

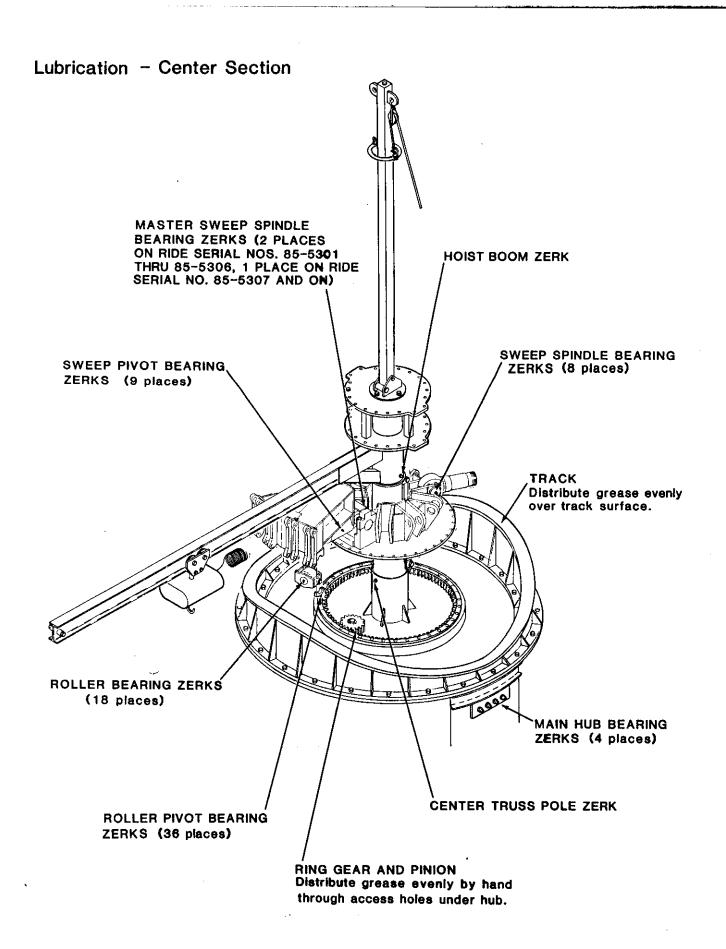
- 2. Check for leaks in the hydraulic system. During transport, the vibrations can cause leaks at hoses and fittings.
- 3. Check for lubricant leaks.

Lubricants Chart

Timely lubrication and the use of high quality oil and grease is necessary to obtain the maximum life of the ride and its components. Use only the oils and grease specified in the following chart.

IMPORTANT: In addition to the following items, certain components require special lubricants. Refer to the "Vendor Literature" section of this manual for lubricant specifications for specific components.

COMPONENT	SPECIFICATION		
All Zerk Fittings and Pinion Gear	No. 2 Lithium Base Grease		
Hydraulic Fluid	Non-detergent motor oil, API Service Classification MS, SAE 10W		
	Examples: D.T.E 24 Mobil 10-10W Universal Hydraulic Fluid		
Pivot Points without Zerk Fittings	Any high quality, multi-purpose machine oil - SAE 20W		
Track	Chance Track Lube (Part Number 237-42263 for 14 oz. tube)		



Maintenance Schedule

IMPORTANT: In addition to the following items, certain components require scheduled maintenance. Refer to the "Vendor Literature" section of this manual for maintenance schedules for specific components.

REF				
NO.	SERVICE POINT	SERVICE REQUIRED	SEE PAGE	
1	Hydraulic Oil Reservoir	Check level at sight glass	5-6	FREQUENCY Daily
2	Ring Gear and Pinion	Grease	4-4	Daily
3	Track	Grease	4-4	
4	Main Hub Bearing Zerks (4 places)		7-7	<u> </u>
5	Sweep and Master Sweep Spindle	Grease Grease	4-4	Wooklu
	Bearing Zerks (10 places on ride serial nos. 85-5301 through 85-5306; 9 places on ride serial no. 85-5307 and on)	Grease	4-4	Weekly, or at every set-up, which-
6	Sweep Pivot Bearing Zerks (9 places)	Grease	4-4	ever
7	Sweep Roller Zerks (6 places on each double sweep)	Grease	4-4	first
8	Center Pole	Grease	4-4	
9	Hoist Boom	Grease	4-4	1
10	Outrigger Hinge (4 places)	Oil		İ
11	Truss End Hinge (4 places)	Oil		
12	Outer Panel Latches (40 places)	Oil		
13	Main Hub Bearing	Check capscrew torque	4-11	
14	Main Hub	Check for cracks	4-11	
15	Master Sweep Bearing Caps	Check capscrew torque	4-11	
16	Vehicle Hangers	Check locknuts	4-14	
17	Spreader Bars	Check for damage or wear	4-12	
18	Vehicle Frame Pivot Zerks (18 places)	Grease	4-14	Monthly, or at
19	Spreader Bar Zerks (2 per long spreader bar)	Grease	4-13	every set-up,
	Spreader Bars	Check adjustment	4-13	which- ever
21	Vehicle Frame Cables	Inspect for damage or wear	4-14	occurs
22	Vehicle Frame Pivot	Inspect for damage or wear	4-14	first
23	Sweep Attaching Points	Inspect for damage or wear	4-14	
		, ·· · · ·	7-16	
24	Hydraulic Oil Filter	Replace with new filter	5-6	Twice each operating season
25	Hydraulic Oil Reservoir	Drain and refill with new oil	5-6	Annually

Safety

The following is a list of a few general selected rules which should be adhered to by everyone.

Remember that in the long run the key to a safe and successful operation is to have well-trained and well-supervised employees.

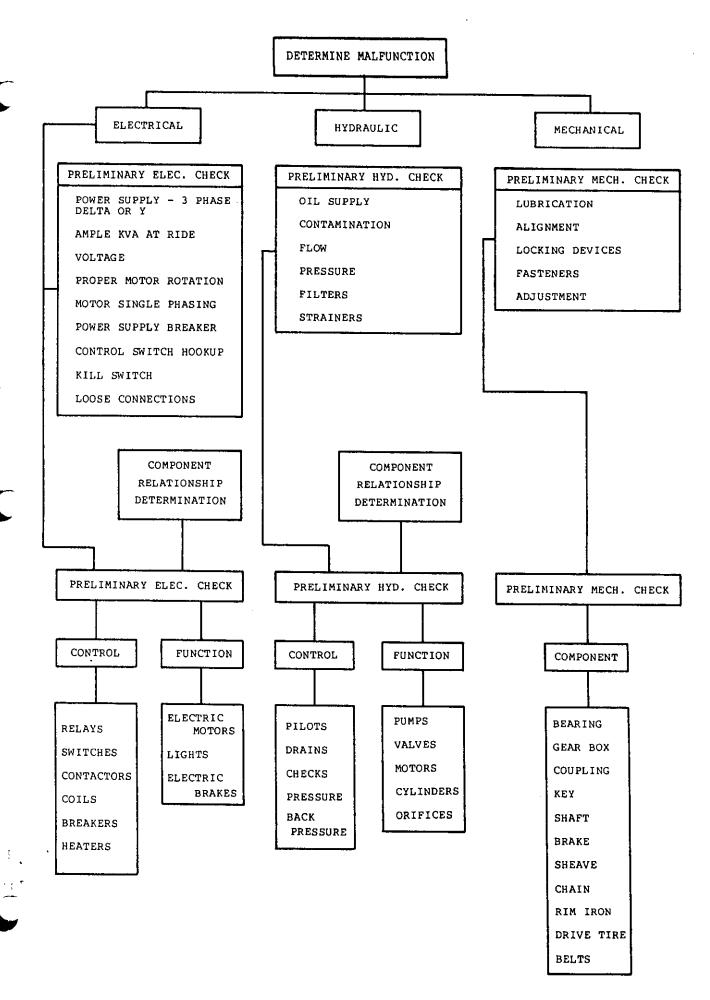
General Safety Guidelines

- 1. All work must be done by competent, qualified mechanics, capable of understanding the function of the parts and their proper installation.
- 2. Inspect the ride before each day of operation to determine that no portion of the ride is damaged, missing or worn in such a manner that it is unsafe, or that unsafe conditions can develop.
- 3. Perform the manufacturer's recommended maintenance procedures at the intervals and in the manner specified in this manual.
- 4. Study each job carefully to determine all hazards so that necessary safeguards can be taken.
- 5. Examine safety devices (tools, ladders, etc.) before they are used to make sure they are in good condition. Ladders must be clean and unpainted.
- 6. Use the proper tool or equipment for each job. Ground all hand electric power tools before use.
- 7. Wear close-fitting, comfortable clothing when working on or close to moving parts or live electrical circuits. Avoid finger rings, jewelry or other articles which can be caught in moving parts or come in contact with electrical circuits.
- 8. Protect your eyes by wearing approved safety glasses or goggles.
- Wear a hard hat at all times. When working in elevated areas, use a safety belt.
- 10. Where work to be performed is hazardous, at least two men shall work together.
- 11. If guards must be removed from equipment, make sure they are replaced before leaving the job.
- 12. Clean up after each job, disposing of surplus materials.
- 13. Keep a record of parts replaced and the date of replacement. Inform the manufacturer of any replacement requirements that are frequent or cause unsafe conditions.
 - 14. Make modifications and additions as outlined in manufacturer's service and safety bulletins.

Troubleshooting Procedures

Before calling the CHANCE CUSTOMER SERVICE DEPARTMENT for help, be prepared with the following information:

- 1. Have ride serial number and name available.
- 2. Have manual ready to use as reference.
- 3. If ride was formerly owned by whom? (Chance records will often show changes made to a ride by its previous owner)
- 4. Have the same person make all calls. Be sure to get the name of the person to whom he is speaking at the factory. All calls should then be made to that person.
- 5. Have a telephone number ready at which you can be reached.
- 6. Have shipping instructions ready (how, when, and where to ship parts).
- 7. Have list of any alterations, modifications or kits that have been added to the ride.
- 8. The person calling the factory must be familiar with the problem and able to describe symptoms of the ride problem (such as: was the problem gradual; did it suddenly quit; are any sounds occurring that are not normal; does the problem occur continuously or is it intermittent; does the ride run one direction only; does the ride run but has no braking, etc.)
- 9. Many times the problem that completely stops a ride from working is one of many simple things that are forgotten or overlooked. Listed on the following chart are many of the items that may cause this, as well as all items that must be checked before any calls are made to the factory. Use this chart to try and determine the cause. It can save several expensive phone calls or a more expensive visit by a factory representative, as well as valuable time.



Special Torquing Instructions

Capscrews used by CHANCE RIDES, INC. are classified as <u>functional</u> load <u>carrying</u> <u>capscrews</u> if:

-They are used as tension members in the erection or operation of a ride

and/or

-They are required to resist shear through friction-type connections in the erection or operation of a ride

Capscrews are selected with consideration to grade, size and quantity, using joint capacities based on tightness torques of 60% of rated yield and group joint efficiency of 62.5%.

Torque Requirements

Unless otherwise specified in this manual, all capscrews must be tightened to the torque values listed in the Torque Chart. These values were selected to produce a tightening torque range of 60% to 70% of proof load, when tightened with a hardened washer under the locknut or capscrew head (whichever is accessible for tightening). When the capscrew is tightened from the head end, apply anti-seize lubricant to the shank of the capscrew. When the threads are lubricated, use 10% less torque to tighten the capscrew.

DO NOT TIGHTEN CAPSCREWS OVER THE RECOMMENDED TORQUE. This can damage the capscrew, due to variances in coefficients of friction and torque wrench accuracy.

Always use a torque wrench. It is impossible to accurately measure the tightness of a capscrew by other methods. Torque 'wrenches must be checked for accuracy twice each operating season.

Capscrew Grades

CHANCE RIDES, INC. uses only Grade 5 or better capscrews and Grade 8 locknuts, with A325 hardened washers for functional loads. The Grade Markings Chart shows the capscrew markings to be found on Chance rides. The manufacturers identification symbols must be present on all functional load carrying capscrews.

CHANCE RIDES, INC. recommends the use of cold-formed hex head capscrews with rolled threads. Hex bolts and hot-formed hex head capscrews are not recommended because they may have machined threads, and can have die seams along the shank.

NEVER REPLACE CAPSCREWS OR LOCKNUTS WITH PARTS OF A LESSER GRADE, OR OF DIFFERENT LENGTHS THAN THOSE SHOWN IN THE PARTS CATALOG SECTION OF THIS MANUAL.

Replacement of Capscrews and Locknuts

When <u>permanently</u> <u>installed</u> capscrews and locknuts are disassembled for repair or adjustment, they must be replaced if they have been in service over five (5) years. Corrosion or other damage can require over-torquing for removal, and therefore make replacement necessary. If a torque wrench is not used to measure excessive removal torques, the capscrews and locknuts must be replaced.

Capscrews and locknuts which are frequently removed for portability must be replaced each operating season. If the capscrews and locknuts become damaged, corroded or require excessive torque for removal, they must be replaced. If a torque wrench is not used to measure excessive removal torques, the capscrews and locknuts must be replaced.

IMPORTANT: For your convenience, the "Parts Catalog" section of this manual lists torque values for specific capscrews in special care areas, as well as their classification of either permanently installed or frequently removed.

GRADE MARKINGS For Functional Load Carrying Capscrews

Manufacturer's identification symbols must be present on all capscrews.

CORRECT MARKINGS	UNACCEPTABLE MARKINGS	
SAE J429 GRADE 5 MEDIUM CARBON 81,000 YIELD	GRADE 5.1 GRADE 5.2 LOW CARBON LOW CARBON MARTENSITIC	
ASTM A325 TYPE 1 MEDIUM CARBON LONGER SHANK & SHORTER THREAD LENGTH THAN GRADE 5 81,000 YIELD		
ASTM A 325 TYPE 3 CORROSION RESISTING LONGER SHANK & SHORTER THREAD LENGTH THAN GRADE 5 81,000 YIELD	ASTM A325 TYPE 2 LOW CARBON MARTENSITIC	
SAE J429 GRADE 8 MEDIUM CARBON 130,000 YIELD	ISO R898 CLASS 8.8 MEDIUM CARBON 92,000 YIELD 88	
ASTM A490 ALLOY STEEL LONGER SHANK & SHORTER THREAD LENGTH THAN GRADE 8 130,000 YIELD	150 R 898 CLASS 10.9 ALLOY STEEL 130,000 YIELD	

Torque Chart

TORQUES FOR FUNCTIONAL LOAD CARRYING COLD FINISHED HEX HEAD CAPSCREWS WITH DRY ROLLED THREADS, USED WITH LOCKNUTS (SEE NOTE 3), AND TIGHTENED WITH AN ASTM A325 HARDENED WASHER UNDER THE CAPSCREW OR LOCKNUT HEAD (WHICHEVER IS ACCESSIBLE FOR TIGHTENING).

THIS TORQUE RANGE WILL DEVELOP 60% TO 70% OF PROOF LOAD.

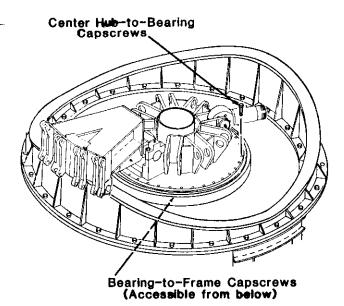
REFER TO "REPLACEMENT OF CAPSCREWS AND LOCKNUTS" FOR CONDITIONS REQUIRING REPLACEMENT.

SIZE	FOOT POUND TORQUE RANGE (SEE NOTES 1 AND 2) WITH LOCKNUT AND HARDENED WASHER		
DIAMETER - THREADS/ INCH	SAE J429 GRADE 5 ASTM A325	SAE J429 GRADE 8 ASTM A325	
1/4 - 20	5-6	7-8	
1/4 - 28	6-7	8-10	
5/16 - 18	11-13	15-18	
5/16 - 24	12-15	17-21	
3/8 - 16	19-24	27-33	
3/8 - 24	22-27	31-38	
7/16 - 14	30-35	45-55	
7/16 - 20	35-40	50-60	
1/2 - 13	50-60	65-80	
1/2 - 20	55-65	75-90	
5/8 - 11	95-115	130-160	
5/8 - 18	105-130	150-180	
3/4 - 10	165-200	235-285	
3/4 - 16	185-225	260~320	
7/8 - 9	270-325	380-460	
7/8 - 14	295-360	415-505	
1 - 8	400-490	565-690	
1 - 12	440-535	620-755	
1-1/8 - 7	495-600	800-975	
1-1/8 - 12	555-675	900-1095	
1-1/4 - 7	700-850	1135-1380	
1-1/4 - 12	775-940	1255-1525	
1-1/2 - 6	1215-1480	1975-2395	
1-1/2 - 12	1370-1660	2220-2700	

NOTES:

- 1. USE ANTI-SEIZE LUBRICANT ON CAPSCREW SHANK WHEN TIGHTENED FROM HEAD END.
- 2. USE 10% LESS TORQUE WHEN ANTI-SEIZE OR OTHER LUBRICANT IS USED ON THREADS.
- 3. USE SAME TORQUE RANGE FOR HOLES TAPPED IN STEEL.

CENTER HUB AND BEARING



Once a week or at each set-up, whichever occurs first, check the capscrews which attach the center hub to the bearing, and the bearing to the frame. Torque the capscrews to 130-160 ft-lb.

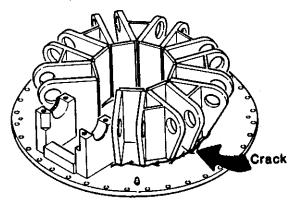
A

CAUTION: These capscrews are 5/8-11 x 2-1/4" long Grade 8, with hardened washers under the heads. They must be tightened to the specified torque for safe operation of the ride. Never substitute a different grade or length of capscrew in the center hub and bearing.

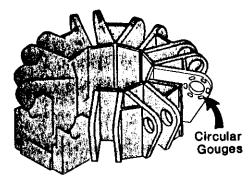
Incorrect parts or torque can cause the capscrews to work loose and eventually fail.

When all bolts are tightened, visually check the edge of the center hub base plate to be sure it is drawn down tightly against the bearing.

Check the center hub base plate for cracks near the points at which the spindle ears are welded, as shown.

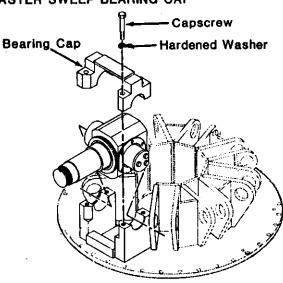


IMPORTANT: Do not attempt to weld, drill or otherwise repair the center hub.



Check the inside surfaces of all spindle ears for circular gouges, as shown.

MASTER SWEEP BEARING CAP



Once a week or at each set-up, whichever occurs first, check the capscrews which attach the master sweep bearing cap to the center hub. Torque the capscrews to 235-285 ft-lb.

CAUTION: These capscrews are 3/4-10 x 5" long Grade 8, with hardened washers under the heads. They must be tightened to the specified torque for safe operation of the ride.



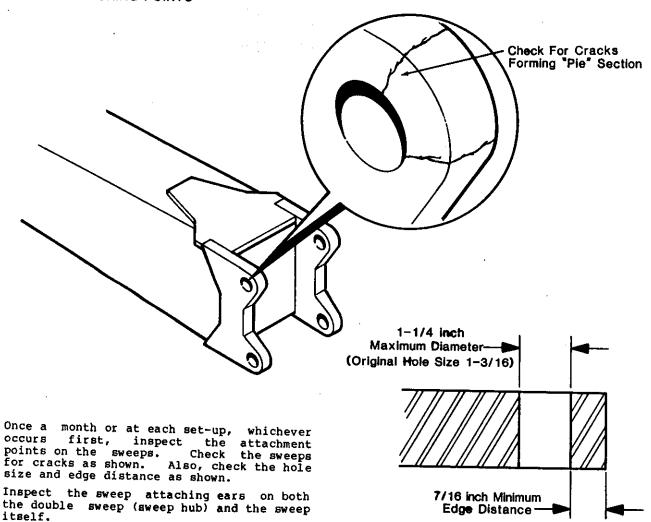
Never substitute a different grade or length of capscrew in the master sweep bearing cap.

Incorrect parts or torque can cause the capscrews to work loose and eventually fail. Capscrew failure at the master sweep bearing cap can allow the sweeps to fall, causing possible personal injury.

MASTER SWEEP BEARING SERVICE

If the bearings are replaced on the master sweep spindle, install shims to obtain 0.003 to 0.005 inch end play. Refer to the "Parts Catalog" section of this manual.

SWEEP ATTACHING POINTS

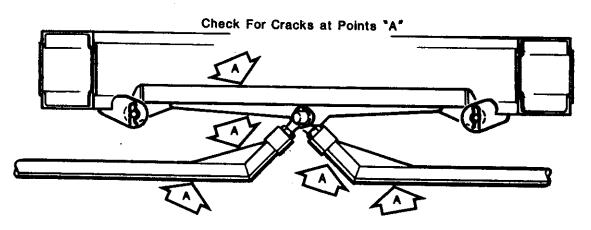


SPREADER BARS

Inspect the spreader bars weekly or at every set-up, whichever occurs first, for cracks at the points "A" (see illustration). Also, check the rod ends for cracks or damaged threads. If a spreader bar is damaged, replace it.

IMPORTANT: Never attempt to weld, drill or otherwise repair the spreader bars.

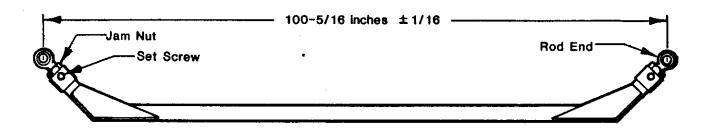
Check the adjustment of the spreader bars once a month or at every set-up, whichever occurs first. Refer to "Spreader Bar Adjustment" for complete procedure. Check the bushings and pins at points "B" for wear. Replace worn parts as required.



SPREADER BAR ADJUSTMENT

Correct adjustment of the spreader bars is essential for smooth, quiet ride operation. Improper adjustment can result in damage to the sweeps, spreader bars and center hub. It also causes rough operation and excessive noise.

Use the following procedure to adjust the spreader bars once a month or at every set-up, whichever occurs first:



- 1. Remove all long spreader bars.
- 2. Loosen ALL jam nuts and set screws.
- 3. Measure the length between the rod ends, center to center, on all long spreader bars. This measurement must be $100-5/16 \pm 1/16$ inches. Adjust the length by turning the rod ends.

IMPORTANT: Both rod ends must be threaded into the sockets an equal number of turns. Always adjust both rod ends equally, within one-half turn.

- Install the long spreader bars on the ride. Install all vehicles.
- 5. Remove one end of the long spreader bar which is 180 degrees from the master sweep (driving sweep).
- 6. Rotate the ride counterclockwise one complete revolution by hand using two or three men.

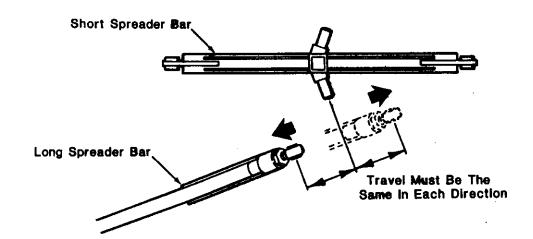
NOTE: Open the hand valve on the hydraulic motor for ease of turning.

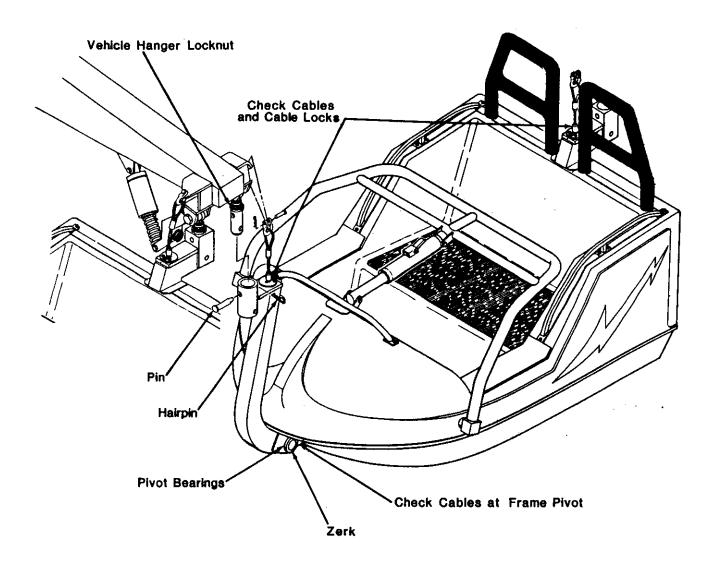
As the ride turns, measure the distance the disconnected rod end travels in relation to the pin on the short spreader bar. This distance or travel must be the same each direction from the pin.

7. If the travel is equal in both directions, install the spreader bar and tighten all jam nuts and set screws.

If the travel is not equal in both directions, adjust the length of each long spreader bar (either longer or shorter) by turning the rod ends. ALL SPREADER BARS MUST BE THE SAME LENGTH. If one spreader bar is adjusted to a longer length, ALL spreaders must be lengthened by the same amount.

Repeat Steps 6 and 7 until the travel is equal.





VEHICLE HANGERS

Check the hangers on the front and back of all vehicles weekly or at every set-up, whichever occurs first. Make sure that the pins and hairpins are in place, and the locknuts tight.

Inspect the hangers (especially the rod end) for signs of wear, cracking, bending or damaged threads. If a hanger is damaged, replace it. DO NOT ATTEMPT TO REPLACE THE ROD END.

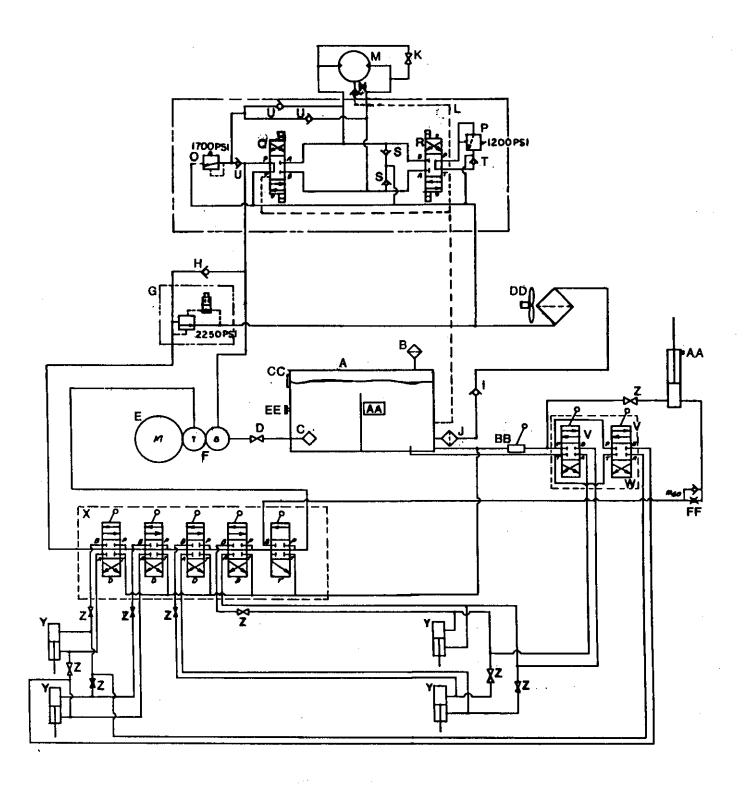
VEHICLE FRAME

Once each month or at each set-up, whichever occurs first, check the vehicle frame structures for cracks, bends and other damage, especially in the pivot area. Check for distorted holes, and be sure the bearings turn freely. Check the condition of the cable where it passes through the pivot areas.

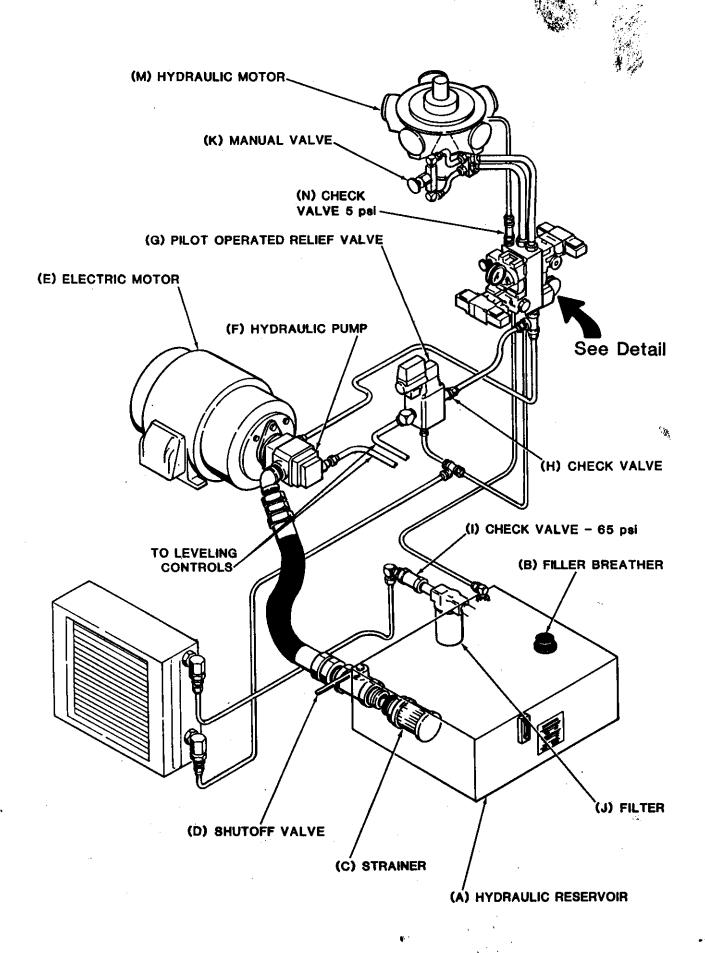
A zerk is provided for monthly lubrication of the bearings.

VEHICLE SAFETY CABLES

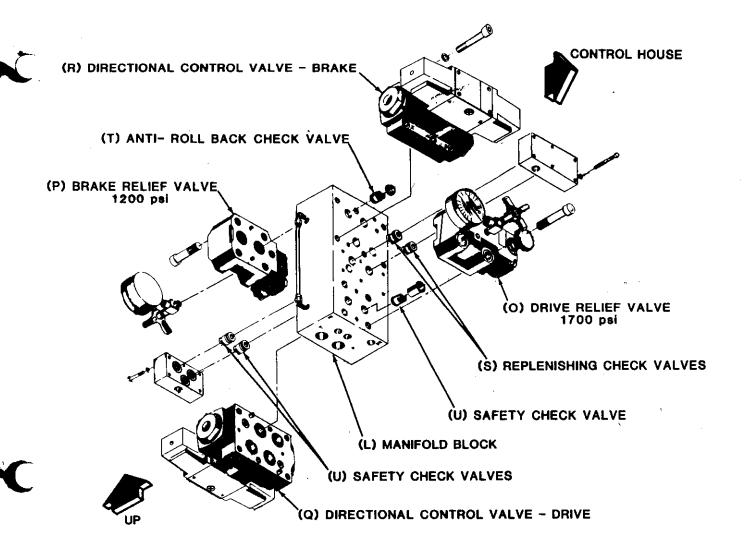
Inspect the cables which run through the vehicle frame daily. Check the cables for signs of fraying or crimping. If a cable is damaged, replace it with a new part. DO NOT ATTEMPT TO REPAIR OR SPLICE CABLES. The cable locks must be installed as shown to hold cables securely in position.



SYMBOL	DESCRIPTION	VENDOR	QTY.	CHANCE PART NO.
λ	HYDRAULIC RESERVOIR	CHANCE 392-632-001	1	376-77634
В	FILLER BREATHER	VICKERS SP-113-C	1	217-12266
С	STRAINER	VICKERS OF3-12-10	1	290-74382
D	SHUTOFF VALVE	MARK 2"	1	207-84426
E	ELECTRIC MOTOR - 20 HP	REULAND	1	237-44982
F	HYDRAULIC PUMP - DOUBLEREPAIR KIT-7 GALLONREPAIR KIT-8 GALLON	VICKERS V2020-1F85-7S-1CC-20 VICKERS 923481 VICKERS 923495	1	290-56125 290-38812 290-38811
G	RELIEP VALVE - PILOT OPERATEDSEAL KITREPLACEMENT COIL (115V/60 HZ, 115V/50 HZ)	VICKERS CT5060A-C-50 VICKERS 361145 VICKERS 633741	1	290-84542 237-17543 290-17435
Н	CHECK VALVE	VICKERS DT8P1-06-05-11	1	290-84406
I	CHECK VALVE - 65 PSI	VICKERS DT8P1-10-65-11	1	290-84405
J	FILTER FILTER ELEMENT (CARTRIDGE)	VICKERS OFM-101-25	1	203-26681
ĸ	FILTER ELEMENT (SPIN-ON) MANUAL VALVE	VICKERS VICKERS MANATROL 1/4*-90	1	290-12945 290-24660 290-84410
L L	MANIFOLD BLOCK		_	
м		CHANCE 337-931A001	1	337-06363 290-24923
	HYDRAULIC MOTOR (TAPERED SHAFT)SEAL KITSHAFT SEAL ONLY	STAFFA STAFFA	•	290-28707 290-64551
M	PORT BLOCK	STAFFA F60410	1	290-43244
N	CHECK VALVE - 5 PSI	BRUNING DC500	1	237-84480
o	DRIVE RELIEF VALVE	PARKER HANNIFIN R6VH-1	1	290-84568
P	BRAKE RELIEF VALVE	PARKER HANNIFIN R6VH-1	1	290-84568
Q	DIRECTIONAL CONTROL VALVE-	VICKERS DG5S-8-8C-2-MW-B20	1	290-84320
	DRIVEREPLACEMENT COIL (115V/60 Hz, 115V/50 Hz)	VICKERS 633741		290-17435
R	DIRECTIONAL CONTROL VALVE-	VICKERS DG5S-8-8C-2-MW-B20	1	290-84320
	BRAKESREPLACEMENT COIL (115V/60 Hz, 115V/50 Hz)	VICKERS 633741		290-17435
s	REPLENISHING CHECK VALVE	CHANCE CSN50A3	2	390-84473
Ŧ	ANTI-ROLL BACK CHECK VALVE	CHANCE CSN50A3	1	390-84473
U	SAFETY CHECK VALVE	CHANCE CSN50A3	3	390-84473
v	DIRECTIONAL VALVE - MANUAL	VICKERS DG17V-3-2C-11	2	290-84689
V	BOLT KIT - 30 MM LONG	VICKERS BKDG3-698	2	272-38861
W	MANIFOLD BLOCK	VICKERS DGMS-3-2E	1	272-06344
x	DIRECTIONAL VALVE - 5 BANK	VICKERS CM11N01-K25-DDDDT-E21	1	276-84461
X	HANDLE KIT	VICKERS CM11-H5-20	1	276-32507
Y	HYDRAULIC CYLINDER	PRINCE AE-7	4	275-21719
Z	SHUTOFF VALVE	MANATROL 1/4"-90	9	290-84410
AA	BREATHER - 1/2 NPT	ARO 20311-4	1	275-26638
ВВ	HAND PUMP	T-K PINE 1000A-8	1	290-56073
cc	SIGHT GAGE	FEDERAL 550-3-H	1	290-29647
סס	COOLER	FAN-EX 17H	1	272-17804
EE	TEMPERATURE GAGE - 1/2 NPT	LUBE DEVICES TMA214-A-1	1	272-45251
FF	CHECK VALVE (1/4" DR. ORIFICE)	C2-800-S12	1	261-84563 5-3



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Detail of Manifold Block

HYDRAULIC SYSTEM

The hydraulic system is an open-type circuit. The system does not have to be bled, since any air in the system will simply be pumped out. The system requires very little maintenance and is relatively trouble free. All of the plumbing, where possible, is of steel tubing. This eliminates hoses which are potential trouble spots.

The principle components of the system are a reservoir, pump, directional valves, relief valves, and the hydraulic motor. Each of these components is explained in the following paragraphs.

The letter beside each component name corresponds to the letter of that component on the hydraulic schematic.

REPLACEMENT PARTS

For replacement parts, refer to the parts list with each schematic.

These parts can be ordered from Chance, but you will generally be able to obtain them by going through a local representative for the product.

REPAIR OF COMPONENTS - GENERAL

NOTE: Before attempting to remove any component from system for repair, refer to the "Vendor Literature" section of this manual for information pertaining to a particular component.

When removing any component from hydraulic system, plug all ports lines, etc. that are left exposed, so that dirt and contamination cannot enter.

Hydraulic Reservoir (A)

The hydraulic reservoir has a capacity of 62 gallons and working oil capacity of 50 gallons. The fluid level should be maintained at 50 gallons, or 5/6 full. The fluid level must be checked daily by the sight gauge located on the side of the reservoir. The fluid level must be within the limits of the sight gauge. For frequency of maintenance on reservoir, see the "Maintenance Schedule".

Air Breather and Fill Cap (B)

This cap must be kept tight at all times to prevent foreign matter from entering reservoir. Clean the breather at the same time the hydraulic filter is changed.

Hydraulic Oil Strainer (C)

The strainer which is located in the bottom of the reservoir strains the oil going to the hydraulic pump. This strainer must be removed at least once a year and washed out with solvent. At this time the tank should also be thoroughly flushed if deposits of dirt, etc. are present in the bottom of the tank.

Shutoff Valve (D)

This valve shuts off supply going from the tank. Be sure this valve is open or system will not function.

Hydraulic Pump Motor (E)

Pump motor is a 20 HP, 3 phase, 1800 RPM electric motor. The motor end shaft couples directly to the hydraulic pump.

Hydraulic Pump (F)

This pump is a double rotary vane type. The motor side of the pump (high speed side) is governed by relief valve (G). The outer side of the pump (low speed side) is governed by a relief valve (A) on manifold block. (See detail of manifold block).

If pump becomes excessively noisy or hot during operation, first check fluid level in reservoir. If fluid level is correct, consult the trouble shooting chart in this manual.

Relief Valve (G)

This solenoid controlled relief valve controls high speed rotation of ride.

Check Valve (H)

Restricts oil from returning to relief valve (I).

Check Valve (I)

This check valve maintains enough back pressure (65 psi) in the return line to shift the directional valves on the manifold block.

Filter (J)

The hydraulic filter is one of the most important components in the system. All

of the oil in the system passes through the filter element, and is cleansed of foreign particles. The removal of these particles from the system greatly prolongs the life of the other components in the system. The filter element must be replaced at least semi-annually, or if system becomes contaminated between changes. See "Maintenance Schedule".

Manual Valve (K)

Releases pressure in hydraulic motor to enable ride to be rotated by hand.

NOTE: This valve must be closed during normal operation.

Manifold Block (L)

This is a machined and ported block which eliminates a major portion of the plumbing normally required for a hydraulic system of this type. Refer to detail of manifold block assembly.

Hydraulic Motor (M)

The ride is powered by a five piston Staffa B-80 hydraulic motor.

Check Valve (N)

This five pound check valve is located in the drain line from the hydraulic motor to the reservoir. The valve maintains enough pressure in the motor to assure that the bearings and seals are always supplied with adequate oil.

MANIFOLD BLOCK

Drive Relief Valve (0)

This relief valve controls ride acceleration by controlling hydraulic oil pressure from the pump to the motor. The relief in the valve is pilot-operated and must be adjusted to 1700 psi.

IMPORTANT: Do not adjust relief valve pressure above the specified pressure to increase the speed of the ride. It will not affect the speed of the ride at all, but can cause abrupt ride movement.

Drive Pressure Adjustment

Open the needle valve for the pressure gauge. Start the ride while observing the pressure gauge. The maximum gauge reading occurs while the ride is accelerating. If gauge does not register the correct pressure, loosen the jam nut behind the control handle. Turn the handle until the correct pressure is obtained during acceleration. Tighten the jam nut down against valve body. Close the needle valve going to the gauge.

NOTE: The gauge will register the highest reading when the ride is first started. After the ride has reached operation speed (12 RPM) the gauge pressure will drop.

Brake Relief Valve (P)



This valve controls the braking of the ride. It is imperative that this valve be properly adjusted to give a fairly quick stop. This prevents the cars from going into a severe swinging condition as they slow down. The valve must be adjusted to 1200 PSI. ALWAYS MAINTAIN THIS PRESSURE SETTING.

Brake Pressure Adjustment

To check the braking pressure, open the needle valve for the pressure gauge. Run the ride in the normal programmed mode. Observe the pressure gauge when the braking cycle first starts. If the pressure is not correct, loosen jam nut behind the control knob. Adjust control knob until the correct pressure is obtained and then tighten jam nut down against valve body. Close needle valve going to gauge.

<u>Directional Control Valves</u> (Q) and (R)

The directional control valves for the drive and brakes are four-way, spring-centered, solenoid controlled and internal pilot operated. The spools have three positions, the center position being open to ports "P" and "T", and closed to "A" and "B".

NOTE: The following description is for the directional control valve for the drive (Q). The brake valve (R) operates similarly.

The drive valve (Q) controls the direction of rotation of the ride by shifting the main spool, which directs oil to one port of the motor or the other.

A solenoid controlled pilot is used to control the shifting of the spool. When the solenoid is energized, the pilot spool shifts, allowing a small amount of oil through a pilot passage in the valve to the back side of the main spool. This oil pushes the main spool, causing it to shift.

Since the solenoids in the valve control the action of the valve, check them first if the ride will not run in forward or reverse.

Checking Solenoid

If it is suspected that the solenoid is not functioning, there is a simple test to verify the problem. There is a hole in the end of the solenoid cap. Insert the end of a small rod (approximately 1/8") into the hole and shift the pilot spool manually. If the valve shifts, the ride will function normally. In this case, remove the end cap and visually inspect solenoid. If the spool is free, check the electrical circuit, using a volt meter or test light (230 volts). If the valve will not shift, remove the solenoid and free the pilot spool. If the electrical circuit is bad, consult the "Electrical" section of this manual.

Replacement of Solenoid

Remove the cover plate and determine how the solenoid is wired. Remove the solenoid and replace it with a new solenoid. Reassemble in reverse order.

NOTE: The above procedure can be performed without removing valve from system.

If main spool still does not shift, check the 65 psi check valve (I). Install a pressure gauge in the return line. If back pressure is not at least 65 psi, remove the check valve and repair or replace it. If the pressure is at least 65 psi, the main spool is probably stuck. Refer to the "Vendor Literature" section of this manual.

Replenishing Check Valves (S)

The replenishing check valves allow the motor to draw oil from the system when the directional valve (R) is shifted for braking. This prevents the motor from cavitating while it is pumping oil over the relief valve (P) during braking.

Anti Roll-Back Check Valve (T)

After braking to a stop from either direction, this check valve keeps the ride from rolling in the opposite direction while loading and unloading passengers.

Safety Check Valves (U)

These three check valves ensure against the rupturing of a hydraulic line if brake directional valve malfunctions. The hydraulic fluid is forced through the drive relief valve for braking action.

NOTE: See following pages for trouble shooting information for this system.

Hydraulic System Troubleshooting Chart

TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
COMPLETE LOSS OF ELECTRICAL POWER	Tripped main breaker Poor connections at power supply tie in	Reset or replace breaker Check and tighten connection
ISOLATED LOSS OF ELECTRICAL POWER	 Tripped circuit breakers in main electrical box Malfunctioning contactor 	1. Reset or replace breaker (See Electrical Section) 2. Replace contact points or coil
COMPLETE LOSS OF HYDRAULIC POWER	1. Pumps not functioning 2. Pumps rotating in wrong direction	1. Check motor and pump 2. Reverse two of the 115 volt lines at power supply tie in
PUMP CAVITATION OR PUMPS EXCESSIVELY NOISY	 Dirty strainers in tank Air leaks between reservoir and pump Low on hydraulic fluid 	1. Remove and clean 2. Reseal or replace lines 3. Replenish fluid
RIDE RUNS IN ONE DIRECTION ONLY	 Bad coil in drive directional valve Stuck spool in drive directional valve Stuck spool in brake directional valve not allowing it to return to neutral 	1. Replace coil 2. Remove end caps and move spool to dislodge 3. Remove end caps enough to move spool to dislodge
RIDE DOES NOT RUN IN EITHER DIRECTION	1. Bad coils in drive directional valve 2. Stuck spool in drive directional valve 3. Defective hydraulic motor 4. Damaged pinion gear from lack of lubrication 5. Malfunctioning drive relief valve 6. Malfunctioning pump 7. 65 psi check valve stuck open	1. Replace coils 2. Loosen end cap and move spool to dislodge 3. See Staffa information in "Vendor Literature" section 4. Replace gear and see Lubrication Specifications 5. Correct pressure setting or disassemble and repair as necessary 6. See Vickers information in "Vendor Literature" section 7. Clean or replace
RIDE DOES NOT STOP FAST ENOUGH WHEN RUNNING IN EITHER DIRECTION	 Wrong pressure setting on brake relief valve Malfunctioning relief valve 	Adjust pressure setting Disassemble and repair
RIDE DOES NOT STOP PROPERLY FROM FORWARD DIRECTION	Brake directional control valve not shifting 65 psi check valve stuck open	1. Replace coil or free stuck spool 2. Clean or replace
RIDE DOES NOT STOP PROPERLY FROM REVERSE DIRECTION	 Brake directional control valve not shifting 65 psi check valve stuck open 	1. Replace coil or free stuck spool 2. Clean or replace



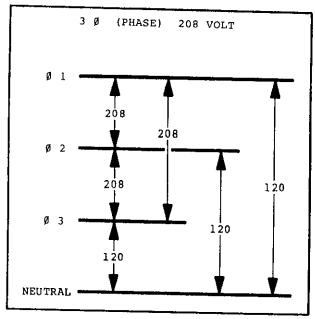
RIDE DOES NOT RUN FAST ENOUGH AND RELIEF VALVE PRESSURE IS SET CORRECTLY	 Blown seals on hydraulic motor caused by clogged return line filter, by-pass not opening Main hub bearing binding up from lack of lubrication 	1. See Staffa information in "Vendor Literature" section 2. Pump grease into it and turn ride until bearing frees up
DAMAGED HYDRAULIC MOTOR	1. 5 psi check valve in motor drain line not holding or stuck open	l. Disassemble and clean or replace
HYDRAULIC MOTOR CAVITATES DURING BRAKING	 Replenishing check valve(s) not allowing oil to reach motor 	1. Remove from manifold block and repair or replace
RIDE DOES NOT RUN FAST ENOUGH AND RELIEF VALVE PRESSURE IS CORRECT	l. Check valve in manifold block is stuck open	1. Replace check valve

6-1

Electrical Troubleshooting

Complete Power Failure

Check the master circuit breaker and reset. If trouble is not there, check the connection at the main power supply. Also, check to see if power is coming to your main power supply tie-in. If there is power at supply source, but not at master breaker, check the power cable.



3-PHASE WYE

Check electrical cable by reading voltage at both ends of the power cable.

IMPORTANT: Avoid the use of excessively long power cables. They will result in low voltage, which causes electrical components to operate improperly.

Electric Motor Failure

Refer to motor manufacturer's troubleshooting and maintenance instructions.

DO NOT ATTEMPT REPAIRS YOU DO NOT UNDERSTAND. CALL THE FACTORY FOR ASSISTANCE.

Lighting Failure

SINGLE BULBS (INCANDESCENT)

Replace burned out bulbs daily. If a 'new bulb is installed and does not light, remove the bulb and, with power turned off, inspect inside of socket. Sockets can become corroded which causes an incomplete circuit, or the tang in the socket can be bent down so that it does not contact the base of the bulb properly. If either of these conditions exists, correct by scraping clean, or by bending the tang up slightly so it makes good contact with base of bulb. Check the pin socket cap for tightness. Make sure the electrical wires are in the pin contact grooves before tightening. If the new bulb still does not light, it will be necessary to replace the socket.

IMPORTANT: Tripped circuit breakers are usually a result of component failure in the system. Repair immediately before damage results to the wiring.

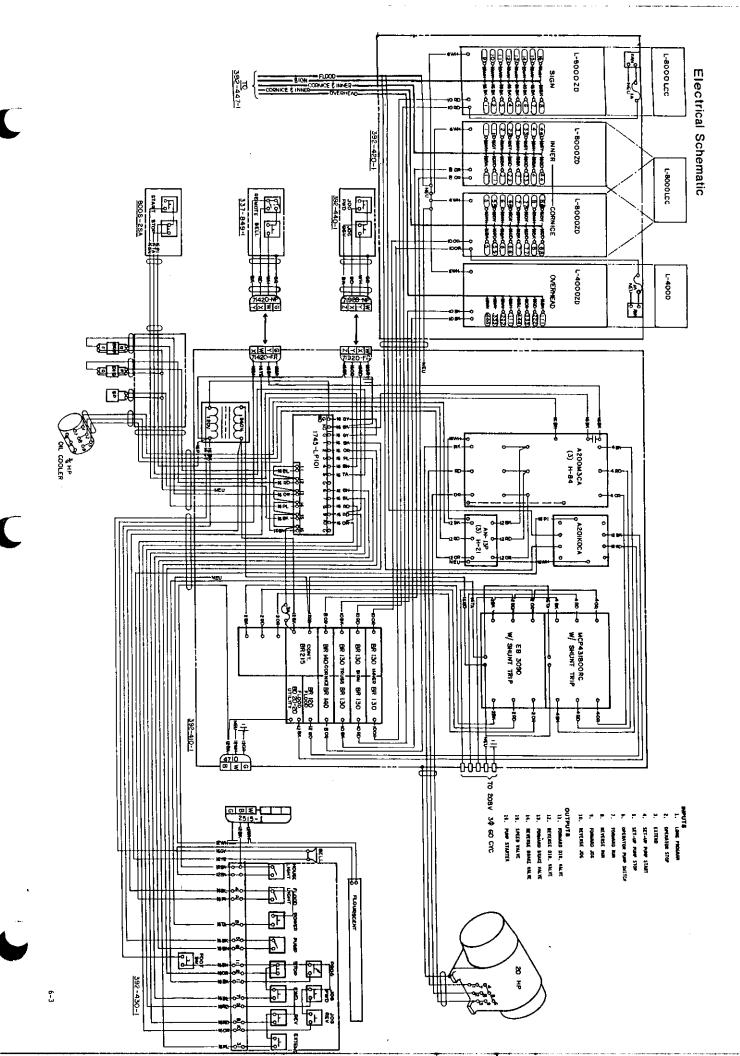
LOSS OF ALL LIGHTING

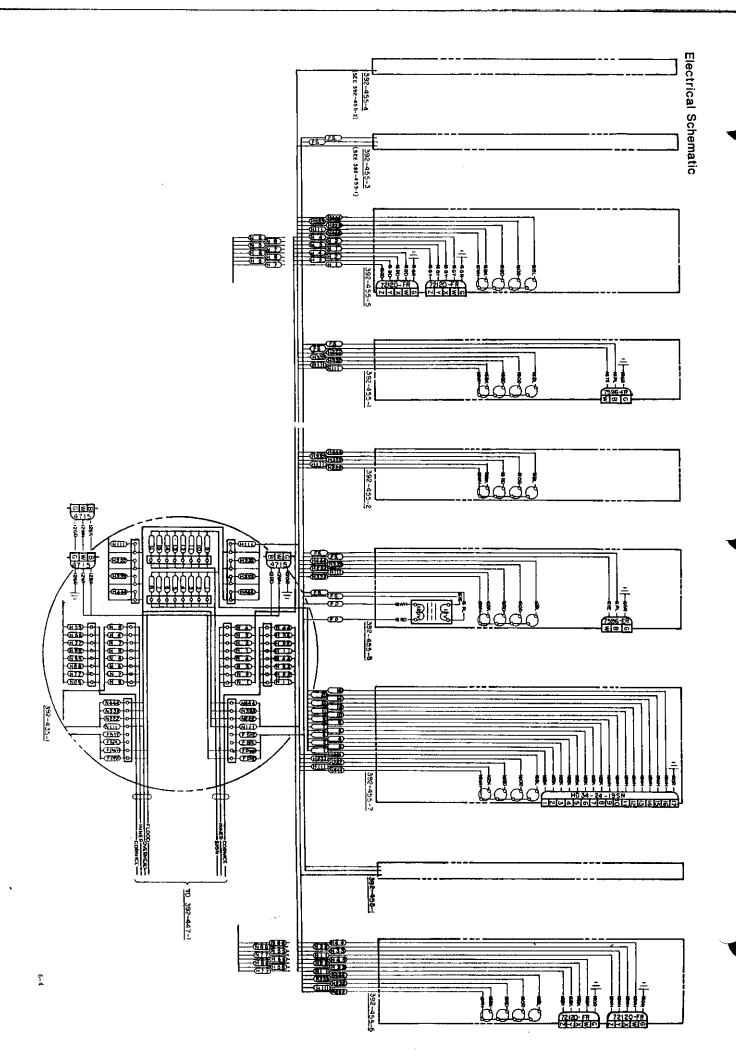
The light switch actuates the coils in the contactors, which control all lights. This circuit has a circuit breaker located in the main electrical box.

In the event that all of the lights go out, first check the circuit breakers. Reset if necessary. If the circuit breaker trips when reset, check the switch and wiring for a direct short.

Although it is rare, contactor coils can short out. If the wiring and switches are okay, then check the contactor coils and the wiring going to them.

Refer to the lighting controller manufacturer's troubleshooting and maintenance instructions.





General Maintenance – Motor and Lighting Contactors

The following general maintenance procedures must be followed for proper operation of motor and lighting contactors. For information on specific components, refer to the "Vendor Literature" section of this manual.

1. KEEP CONTROLLERS CLEAN AND DRY

Industrial controllers seldom operate in clean, dry places. Dust, dirt, oil and moisture reduce the insulating distance between otherwise clean and dry surfaces, and cause sluggish mechanical action of electrical controllers.

Accumulation of dust and dirt must be removed regularly, either by vacuum or by blowing with compressed air. Avoid excessive air pressures because sharp, small particles can be driven into some insulating materials. Special attention is required to remove metallic dust with metallic properties, which can collect and adhere to the magnetized parts of the controller. Dirt, oil and moisture are usually removed by wiping the surfaces with cloths and suitable solvents.

Moisture due to condensation can collect within an enclosure. Drainage holes are not normally acceptable to relieve this condition. Heaters are often used to prevent condensation moisture. The heaters are most essential when the controller is idle. When in operation the coils and resistors within the enclosure usually provide enough heat to prevent condensation.

2. REPLACE CONTACTS THAT ARE WORN VERY THIN OR BADLY BURNED AND PITTED.

Replace contacts in pairs. Maintain the correct contact pressures.

When controller contacts open or close, they are subjected to mechanical wear and arcing (electrical burning). The reason for this is that the contacts close with a rolling movement combined with a wiping action. Although this action insures a good contact and confines the arcing to the tips of the contact, both conditions cause wearing of the contacts. Contact parts, therefore, are items that can require considerable maintenance, depending upon the operating conditions. The actual mechanical wear of contacts that operate frequently can be more serious than the electrical burning caused by the arcing.

As contacts wear, the material in them gradually disappears because of both mechanical wear and electrical burning. During the wearing process, the contact pressures decrease. This affects the current-carrying ability of the contacts and eventually can cause overheating of the contacts. A small contact with suitable pressure will carry current with less heating than a large contact with little or no pressure. Reasonable provisions are made for the wearing of the contacts, but replacements will eventually be necessary. Manufacturers furnish information on correct contact pressures for their devices. The contact pressures can be reduced either because of worn contacts or damaged contact springs. If contact springs have been overheated, they may be unable to provide sufficient contact pressure because the material has been weakened by the overheating. Contact pressures should be checked and maintained within the limits specified by the manufacturer.

Always replace both moving and stationary contacts.

Since contacts operate in pairs, replacement must never be made of a single contact so that a new contact will operate with an old contact. The extra time and expense spent in replacing both contacts will repay itself many times over in operating life.

3. KEEP CONTACTS CLEAN.

Do not change contact shape by rough filing or grinding.

Contacts are generally made of copper or silver. Silver contacts are generally used on the small current-carrying contacts of relays, electrical interlocks, push buttons, thermostats, pressure switches and similar devices. The remainder of the contacts are usually made of copper. Contacts must be kept clean. This is especially true of copper contacts because the discoloration that soon appears on clean copper is a poor electrical conductor. It increases the contact resistance and is often the cause of serious heating of contacts. When contacts are replaced, clean the new contact, if it is discolored, and the surface against which it is mounted. The discoloration (copper oxide) increases the resistance of the contact surface. The higher resistance causes more heating and the increased temperature causes more oxidation and higher resistance. The effect is always cumulative and the heating increases until the parts overheat, deteriorate or burn.

The slight rubbing action and burning that occur during normal operation will generally keep the contact surfaces clean enough for good service. Copper contacts which seldom open or close, however, will readily accumulate the thin discolored surface that can cause heating.

This is not true of silver contacts. The discoloration that soon appears on clean silver is a relatively good electrical conductor. It is not necessary to keep silver contacts clean except for appearance sake.

Burned Contacts

When excessive currents are closed or opened, or when contact motion is sluggish, the contact surfaces can be severely burned. If this burning causes deep pits, craters, or a very rough surface, both the stationary and moving contacts must be renewed.

However, it is not desirable to have contact surfaces entirely smooth. Slightly roughened surfaces that appear during normal operation, if clean, provide better contact area than smooth surfaces. Contacts, therefore, with surfaces comparable to very coarse sandpaper may be considered in good condition.

Contacts that are dirty or excessively rough must be cleaned and smoothed with a fine file. Use care to maintain the true surface shape or contour of the original contact. Much time and effort has been spent to determine the best contact shape. Changing the original shape by careless filing will leave high points or edges that can overheat. Do not use emery paper to clean contacts since it is an electrical conductor. Furthermore, some particles can become embedded in the contact surfaces and will cause unnecessary wear.

When a silver contact face has one corner burned, the contact can be used again if ample silver remains to permit carefully removing the burned surface to restore the smooth and true contact shape.

Badly burned and pitted points must be replaced with new parts.

When a contact surface has been worn away unevenly by mechanical wear, replace with a new pair of contacts.

Welding of Contacts

When contacts close, there is usually some "bounce" or rebound. This is due to the reaction of the contact springs as they are compressed to provide the final contact pressure. When the contacts bounce, they separate. At this time the contacts are carrying current and, even though the separation be very small, an arc is created. This arc can cause sharp projections of burned or roughened contact surfaces to overheat, and can weld or "freeze" the contact surfaces together. Under such conditions the contacts will not open correctly. Other causes of contact welding are:

-excessive currents when contacts close or open;

-insufficient contact pressures;

-sluggish operation either when closing or opening;

-momentary closure of contacts without much or any pressure applied.

Well designed contacts, properly installed, reduce this possibility to a minimum.

Check contact pressures on a spring balance by reading the scale when the contacts separate. The pull must be in a direction perpendicular to the contact surface.

4. KEEP CONTACTS AND ALL CONNECTIONS TIGHT.

Any loose electrical connection will eventually cause trouble. An open circuit or a loose connection can cause lost time and production because they are often difficult to find. Also, a loose connection can cause a poor contact of high resistance. Other loose connections cause similar heating and on thermally operated devices, such as a heater of a thermal overload relay, may cause the relay to trip and stop a motor when the motor is not overloaded.

The bolts or fastening devices that hold contacts in place must always be tight. Normal expansion and contraction of metals due to temperature changes or excessive vibration will cause bolts or nuts to become loose. Frequent checking for loose contacts is, therefore, advisable.

5. DO NOT OIL CONTACTOR OR RELAY BEARINGS. KEEP THESE UNITS CLEAN AND WITH NO FRICTION IN THE MOVING PARTS.

Since the correct operation of the contactor depends on the unit being completely clean and free from foreign material, contactor and relay bearings require no lubrication. If lubricated, the accumulation of oil and dirt can cause sluggish mechanical action, causing excessive arcing or welding of the contacts. Except for bearings of master switches, drum controllers and similar units, no lubrication of controller parts is necessary.

6. OPERATE COILS AT RATED VOLTAGE.

Both overvoltage and undervoltage conditions are undesirable.

Coils provide the electro-magnetic pull that opens or closes the contacts of relays and contactors. Series coils generally carry heavy currents and have relatively few turns of rather heavy copper. Shunt coils have many turns of insulated wire. They are generally impregnated in a vacuum or under pressure with insulating compounds, and are covered with insulating tapes or materials. The impregnating compounds produce a firm but resilient binding material that prevents cracks when temperature changes occur. The impregnation process eliminates air pockets within the winding, and it makes the coil a solid mass that is better able to radiate heat and is less subject to mechanical damage.

Operating Voltages

Shunt coils for A-C devices are designed to close them at 85% of the rated voltage. Coils for D-C devices will close them at 80% normal voltage. Any coil is expected to withstand 110% rated voltage without damage.

Open Circuited Coils

A coil with an open circuit will not operate the contactor or relay. Replace a questionable coil immediately with one that is known to be good. The questionable coil can then be checked for open circuits.

Short Circuited Coils

If some turns of a coil become short circuited, the resistance of the coil will be reduced. More current then passes through the coil. The increased current will cause higher coil temperature and can cause coil burnouts.

Overvoltage

Coils must be operated at the rated voltage. Overvoltage on coils causes higher coil temperature that shortens the coil life. Overvoltage also operates the contactor or relay with unnecessary force and causes more mechanical wear and bounce when closing.

Undervoltage

Undervoltage on coils causes contactors and relays to operate sluggishly. The contact tips may touch but the coils may be unable to completely close the contacts against the contact spring pressure. Under these conditions the contact pressure is below normal and the contacts can overheat and weld together.

7. CORRECT CONDITIONS THAT CAUSE EXCESSIVE TEMPERATURES.

Measure the temperature if in doubt about overheating.

Overheated parts always indicate trouble. However, it is often difficult to know when temperatures are excessive.

Resistors are operated safely at 360 degrees Celsius rise above ambient temperature but insulated coils are generally restricted to 85 degrees Celsius above ambient. Solid copper contacts are limited to a rise of 65 degrees Celsius and copper bus work to 50 degrees Celsius rise.

Barring the presence of gases, acids or alkalis, copper parts with much discoloration have been or are too hot. When in doubt, measure temperatures by thermometer or other means. Never rely on the touch of the hand because safe operating temperatures of many electrical parts are unbearable to the hand. It is best to know what the permissible temperatures are and then measure them.

Thermally operated overload relays must be in approximately the same ambient temperature as the motors they protect. If the relay is in a much higher ambient temperature than the motor, it will trip when the motor is not overloaded. If the relay is in the lower ambient temperature, it may not trip in time to protect the motor. If the ambient temperatures must be different, some compensation for the different temperatures can be made by proper selection of the overload relay heaters or by providing a relay that compensates for temperature differences.

Moisture Damage to Electrical Components

If any of the electrical components become water damaged from flooding or by water from any source, remove the components from the ride. The components will have to be thoroughly dried before being put back in service. It is suggested that after removing components from the ride that they be taken to an electrical service shop for proper drying and inspection. This is especially true if components were damaged by flooding, as flood waters are extremely dirty, and all components will have to be thoroughly cleaned. Since it may not be practical to have components serviced immediately, the following instructions contain information for drying components.

Cleaning and Drying

CLEANING

The methods of cleaning electrical insulation include:

-wiping off dirt with a clean, dry cloth;

-blowing out dirt with compressed air;

-drawing off dirt by suction;

-air blasting with ground nut shells or ground corn cobs;

-removing the soil with solvents;

-washing off with water, hot alkali and emulsion cleaners.

The method selected will depend on the type of components, the type of insulation, the type of soil, and other conditions involved.

WIPING CLOTHS - Cleaning with a dry cloth may be satisfactory when the component is small, the surfaces to be cleaned are accessible and only dry dirt is to be removed.

DO NOT USE "WASTE", as lint will adhere to the insulation and increase the collecting of dirt, moisture, and oil. This is particularly objectionable on high-voltage insulation as it tends to cause concentration of corona.

COMPRESSED AIR - Blowing out dirt with a jet of air is usually effective, particularly when the dirt has collected in places which cannot be reached with a cloth. Cleaning can be done more quickly with compressed air than with a cloth, especially on large components.

It should be noted that if blowing with compressed air simply transfers dirt from one place to another in the machine, little or no good has been accomplished.



CAUTION: Wear adequate and approved eye protection such as spectacles with side shields or goggles when blowing out dust or dirt. Approved dust respirators may also be needed for respiratory protection. Do not direct the jet of air towards any person.

The following conditions are emphasized:

- 1. Do not blow the compressed air against insulation unless the air is dry and does not carry water which may have condensed and accumulated in the air line.
- Do not use air pressure greater than 30 pounds per square inch.
- 3. Too high a pressure may damage insulation and blow dirt under loosened tape.
- 4. Do not direct the stream of compressed air in such a way that the dirt will be blown into some inner recess from which it would be difficult to remove the dirt and where it might close ventilation openings.

BRUSHING AND SUCTION CLEANING - Dry dust and dirt may be removed by brushing with a bristle brush, followed by vacuum suction cleaning. Do not use a wire brush. Vacuum cleaning is an effective and desirable method of removing dry and loose dirt, since it does not scatter the dirt and thereby avoids settling of the dust on other components.

AIR BLASTING - Air blasting with ground nut shells can be satisfactory for removal of hard dirt deposits from insulation. Use mild abrasives such as 12-20 mesh ground walnut shells. If a softer abrasive is required, use ground corn cob.

The cleaning can be done in a cabinet type, air blasting machine or by an operator directing the jet of abrasive, at a small area long enough to remove the dirt without damaging the insulation. Canopies or other shields must be erected to prevent unnecessary contamination of other equipment or areas.

SOLVENTS - If the accumulated soil contains oil or grease, a solvent is usually required to remove it. A rag wet with solvent can be used for wiping. The component can be sprayed with solvent or dipped into the solvent. Vapor degreasers which have come into use within the last few years for cleaning will be discussed in a later section.

Solvents for cleaning are divided into three groups;

-Petroleum distillates;

solvents: including chlorinated solvents, mixtures of chlorinated and petroleum solvents, aromatic or coal tar solvents, alcohols and lacquer thinners:

-Water, hot alkali or emulsion cleaners

Petroleum distillates

It is recommended that only this type of solvent be used where a solvent is required for cleaning electrical components.

Petroleum distillates which are classed as "Safety Type Solvents" and have a flash point above 100 degrees Fahrenheit (37.8 degrees Celsius) are supplied by practically all oil companies under various trade names. Included in this group of solvents are:

-Westinghouse solvents 1609-1 and 1609-2:

-Stoddard solvent (described in the specifications of the U.S. Bureau of Standards, 1940, under the title of "Commercial Standard CS3-40");

-Mineral spirits;

-Cleaner's naphtha;

-Similar products with a flash point above 100 degrees Fahrenheit and a Kauri Butanol number not exceeding 39.

These solvents are all flammable at temperatures above the flash point. Since the flash point of the solvents mentioned above is higher than that of certain other petroleum distillates, such as gasoline, the safety type solvents present a lesser fire hazard. NEVER USE GASOLINE.



Petroleum distillates WARNING: are flammable and form explosive mixtures with air. AMPLE PRE-CAUTIONS MUST BE TAKEN TO TAKEN TO PREVENT FIRES AND EXPLOSIONS.



WARNING: Air containing vapors of these solvents can have toxic effects when inhaled.

Always use with adequate ventil-

The ventilation in shop areas is usually sufficient to avoid harmful accumulation of petroleum solvent vapor unless it is used as a fine spray, but when solvent is used on warm apparatus or in hot locations, the evaporation rate will be higher and more attention must be paid to providing proper ventilation. In confined spaces, also, the need for ventilation must be considered.

Avoid continuous or repeated contact of these solvents with the skin. Neoprene coated gloves and aprons can be used to provide protection against skin contact.



WARNING: Gasoline, V.M. & P. naphtha and similar grades must not be used for cleaning, because they are more volatile than the recommended grades, and therefore present too great a fire and explosion hazard.

IMPORTANT: Some cleaning fluids marketed under the general name of "Safety Solvents" contain appreciable quantities of chlorinated solvents to reduce their flammability. This type of solvent should not be used generally because of the high toxicity and changing flammable properties.

Other Solvents



CAUTION: Carbon tetrachloride and benzol are highly toxic solvents and should not be used for cleaning purposes. Safe breathing concentrations of these solvents are extremely Death may result from low. breathing high concentrations of these vapors.

When a low-power petroleum solvent does not provide proper cleaning, a stronger solvent can be necessary. Where a special cleaning job of this kind occurs, it must be performed only under expertly only controlled conditions for adequate ventilation and personal protection. Among the strong solvents to consider in cases of this kind are: -Chlorinated solvents, such as Trichloroethylene, perchloroethylene, and Methyl Chloroform;

-Mixtures of chlorinates solvents and petroleum solvents (generally these mixtures should be avoided);

-Coal tar solvents, such as Toluol, Sylol, or products containing these materials;

-Alcohols and lacquer thinners.

WATER. EMULSION AND ALKALI CLEANING - Electrical components which are clogged with mud and other foreign matter by plant operations, dust storms, floods, or other unusual conditions, require thorough washing. This can be done by immersion, hose washing, or pressure spray from a steam generator. Steam from a shop line or a spray of hot water and compressed air can be used. When tar, wax, grease or oil are to be removed from insulation, add a nonconductive detergent to the water. These compounds contain non-ionic emulsifying agents. Some, known as emulsion cleaners, also contain solvents to soften the hard deposits, so that they can be more easily washed off. These compounds are not electrical conductors and are safe on insulation.

In special cases, hot alkaline cleaning solutions can be used, but are not recommended for general use. They remove tar and grease faster than emulsion cleaners, but are electrical conductors and are not safe for cleaning insulation. Care must be taken to remove the conductive film residue from the insulation by thorough washing with clean water. After any cleaning operation where water is used, remove the water as promptly as possible. (See "DRYING").

When deposits of grease, chemicals, or other foreign matter are to be removed from components, the use of a steam spray machine can be helpful. Portable units generate steam electrically and project a pressure spray of hot cleaning solution through a hose and nozzle. Valves are provided to produce steam or a water rinse if desired.

The spray cleaning equipment can be modified to use steam from a shop line, or a spray of hot water and compressed air.

To avoid damage to insulation, the temperature of the water or cleaning solution must not exceed 90 degrees Celsius (194 degrees Fahrenheit) and the pressure at the windings must not exceed 30 pounds per square inch.

After any cleaning operation where water is used, remove the surface moisture with a clean cloth. Dry the insulation promptly to minimize the amount of water which soaks into the insulation.

Drying

DRYING ELECTRICAL INSULATION

Electrical components, after cleaning or storing, must be dried before being placed in operation if tests indicate that the insulation resistance is below a safe minimum value. Moisture can come from:

- -Exposure to rain, snow, or fog;
- -Exposure to humid atmosphere;
- -Cleaning with water or aqueous solutions.

Normally, components can safely be placed in service without special drying, if a careful inspection of the windings discloses no defects, dirt, or visible moisture, and if insulation resistance tests are satisfactory.

Components must be dried if a hot insulation resistance test shows a value below a safe minimum, which is usually accepted to be one megohm for each 1000 volts of operating or rated voltage, and a minimum of one megohm for operating voltages less than 1000 volts.

The method of producing and applying the heat depends on a number of widely varying conditions. Ideal conditions are seldom found and consequently, the drying often requires a great deal of ingenuity and resourcefulness on the part of the operator. Since much damage can be done by improper heating of the windings of electrical components, it is very important that this type of work be done only by competent persons. Consult the manufacturer's nearest sales office for instructions if there is any doubt as to the proper procedure.

When heat is applied to the windings of electrical components, it must be regulated in such a way that the insulation will not be damaged by overheating. Also, the heating rate must not be so rapid that internal vapor pressures will develop and cause the formation of pockets or blisters, which can rupture the insulation.

Adequate provisions must be made for circulating the hot air within the component which is being dried to remove the vapors. If the component is enclosed, openings must be provided for the escape of moisture-laden air and gases.

The temperature of the insulation must not exceed 85 degrees Celsius (185 degrees Fahrenheit) during drying.

METHODS OF DRYING

There are two general methods of drying the insulation of windings:

-External heat;

-Internal heat.

A combination of externally applied heat and internally generated heat may be found to be desirable under certain conditions.

Drying with External Heat

Oven drying is particularly desirable for small transformers, D-C armatures, control apparatus, etc. Ovens have also been used extensively for salvaging components which have been under flood waters.

Ovens must be ventilated to provide circulation of air and to permit removal of moisture.

Electric heaters or steam coils can be placed inside the ovens, or air can be preheated by passing over electric heaters or steam coils before being blown into the oven. Some form of temperature indicating device must be provided to permit proper heat regulation.

Temporary ovens can be constructed of asbestos board, sheet, iron, brick or concrete block, and lined with non-combustible heat insulating material. Various types of heating can be used, but smoke and soot must not be permitted to enter the oven. Proper precautions must be taken to eliminate fire risk. Fire extinguishers such as the dry chemical or carbon dioxide type must always be available.

With Forced Air

Hot air can be forced or blown through electrical apparatus to dry its insulation. Heat the air with steam coils, hot air furnaces, electric heaters or open fires. Although it will remove surface moisture quickly, generally this method is inefficient and costly, unless a blower and air duct have been provided for the permanent installation and there is ample space to locate a heating unit in the duct.

With Electric Heaters

External drying of the insulation of electrical rotating apparatus by electric heaters distributed under the end windings is strongly recommended. Space heaters are most convenient for this purpose. Typical heaters are only 3/16" thick, 1-1/2" wide and from 12" to 43" long, depending upon their capacity. The cost of the heaters is low and their installation will cost very little. These heaters are sturdy and have so many applications that the salvage value is high.

With Infra-red Lamps

Heating by infra-red lamps is desirable in some cases. Use a group of these lamps, depending on the size of the component. Focus the heat from the lamps on the parts to be dried. Be careful not to overheat the insulation.

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MFG: CHANCE RIDES, INC.

NAME: ALPINE

BOBS/THUNDERBOLT
TYPE: NON-KIDDIE

THUNDERBOLT, ROCK AND ROLL ALPINE BOBS

Field inspection and test guide
Manual number 24329307



THUNDERBOLT, ROCK AND ROLL, ALPINE BOBS

Field inspection and test guide

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Introduction

Proper maintenance is essential to the safe operation of this ride. The tests and inspection points outlined in this field guide are not intended to replace the recommended maintenance schedule. This guide does not contain maintenance and repair procedures and should only be used as a ride inspection and test guide.

When repairs are necessary, use only those components authorized, specified or provided by the manufacturer. If any alterations, modifications and/or additions, installations of unauthorized components are made to the original design without the manufacturer's explicit written consent or without direct supervision by a manufacturer's representative, CHANCE RIDES, INC, makes no claims as to the integrity of the altered or modified ride (product).

Information in this field inspection and testing guide applies only to products manufactured by CHANCE RIDES INC. built after January 1, 1986 (Thunderbolt, Rock And Roll, or Alpine Bobs serial number 392-00886 and on).

CHANCE RIDES INC., reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to such changes.

Manufacturer's Specifications¹⁸

Reference Standards - F24 Standards on Amusement Rides and Devices

1. F583 Maintenance Procedures for Amusement Rides and Devices

2. F893 Inspection of Amusement Rides and Devices

3. F1159 Design and Manufacture of Amusement Rides and Devices

Chance Rides, Inc., at the time of the initial design and prototype manufacture, determines by calculations and testing the appropriateness of the functional design criteria. The visual esthetics of the ride are also evaluated and together with the functional design criteria make up the manufacturer's design specifications. These design specifications are adhered to on all subsequently produced rides of the same style. Occasionally, through field experience, it becomes necessary to specify a modification to the original design specifications. Actual modification to meet the change in design specifications can only be performed by qualified personnel, following the directives of a Chance Rides, Inc. Service Bulletin, Service Kit, or a Chance Rides, Inc. representative, where applicable.

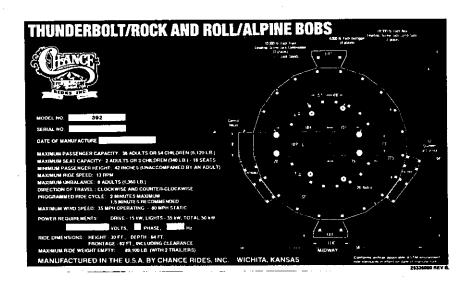
Any modification performed on a Chance Rides, Inc. product outside the recommended directives established by Chance Rides, Inc. as referenced above, constitutes an unauthorized modification. Chance Rides, Inc. specifically disclaims any liability for losses associated with any unauthorized alteration and/or modification to any of its products. Chance Rides, Inc. will not issue letters for the operation of rides which do not meet the manufacturing specifications; this includes cases where the non-conforming modification is of an aesthetic nature only.

It is the responsibility of the individual inspector to thoroughly inspect the ride as deemed necessary, based on his knowledge and field experience to determine that the ride meets the manufacturer's specifications and/or is safe for operation.

Ride description

The **Thunderbolt**, **Rock And Roll** and **Alpine Bobs** are each mounted on a single trailer, with an auxiliary trailer providing additional racking provisions for portability. The rides have an electro-hydraulic drive system, with hydraulic braking. The ride information plaque is mounted to the center hub support tower. It lists specifications, operating dimensions, ground loads, as well as model and serial number and date of manufacture.

Detailed operation and maintenance information is available in the *Thunderbolt Operation And Maintenance Manual* (manual number 24326800). For more information, or to order manuals, contact CHANCE RIDES, INC.



The ride information plaque is mounted to the center hub support tower. The ride information plaque shown is for example only. Always refer to the information plaque mounted to the ride being inspected.

The terms "right hand" and "left hand" as used in this manual are determined by standing in front of the ride and facing the ride.

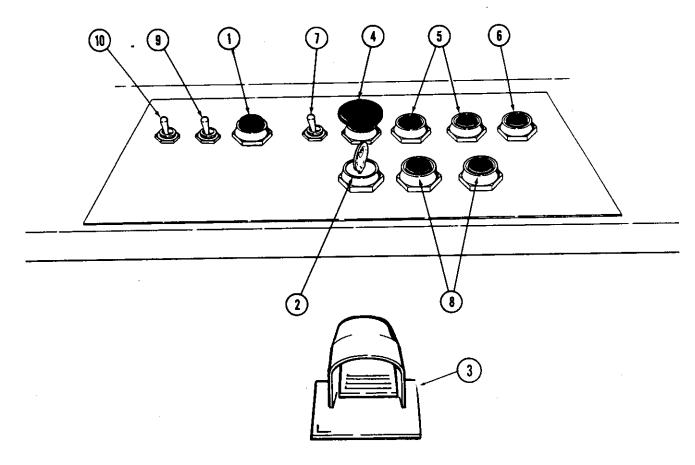
Operation

Operating controls

- 1. Power switch This switch turns off the main power circuit breaker in the motor control cabinet.
- 2. Program switch This key-operated switch selects the short or long ride program for the "RUN" mode. Do not change the program switch after the ride is started.
- **3. Operator presence switch** This foot switch must be depressed to operate the forward, reverse or jog switches. If the switch is released, the drive program is interrupted and the ride will brake to a stop.
- **4. Stop switch** This switch interrupts the drive program. The ride will brake to a stop.
- **5. Forward and reverse switches** Use these switches to start the programmed ride cycle. The operator presence switch must also be depressed. Stop the ride completely before changing the direction of rotation.
- **6. Extended program switch** After the ride starts, hold this switch down to extend the length of the ride cycle. As soon as the extended program switch is released, the ride will slow and brake to a stop.
- **7. Pump switch** This switch controls the hydraulic pump. Turn the switch off before leaving the control house. Do not stop the ride by turning off the pump.
- 8. Jog forward (clockwise) and jog reverse (counterclockwise) switches These switches allow the operator to slowly rotate the ride to any position for erecting the ride or loading passengers. The operator presence switch must also be depressed.
- **9. Flood lights switch** This switch controls the flood lights on the outer posts.

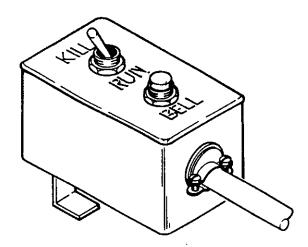
Operator's control panel

- 1. Power switch
- 2. Program switch
- 3. Operator presence switch
- 4. Stop switch
- 5. Forward and reverse switches
- 6. Extended program switch
- 7. Pump switch
- 8. Jog forward and reverse switches9. Flood lights switch
- 10. House lights switch



· 10. House lights switch - This switch controls the lights inside the control house.

Remote stop / bell switch



11. Remote stop / bell switch - During normal operation, there must be two operators, one in the control house and one platform operator at the opposite ride entrance. The platform operator uses the remote stop / bell switch. The stop switch has on and off positions to stop the ride in an emergency. The bell is used to communicate with the control house operator.

Operating the ride (Test cycle)

The operating procedure is provided in the *Thunderbolt Operation Manual and Parts Catalog*. Make sure that a copy of the manual is readily available. This ride requires two operators.

Check for excessive vibration or excessive oscillation of the vehicles. Check the overall performance of the ride based on previous operating performances of the individual ride.

General inspection and testing

Testing

Field performance testing of amusement rides¹

The following specifications conform with ASTM F846 standard guide for Testing Performance Of Amusement Rides And Devices, in effect on date of ride manufacture.

Erection or installation testing

Each erection or installation of a ride shall be given an inspection prior to carrying passengers that shall include but not be limited to the following:

- a. Determine that ride has been erected according to the set-up procedures in the operations manual.
- b. Inspect field inspection points listed in the Field Inspection Guide.
- c. Visual check of all passenger carrying devices including restraint devices and latches, and the pins and capscrews securing them.
- d. Visual inspection of entrances, exits, stairways and ramps and devices securing them.
- e. Test of all communications equipment necessary for operation of the ride or device.
- f. Operate the ride to determine that direction of travel conforms to the information plate, ride manual field inspection guide of specification sheet.
- g. Operate the ride for a minimum of three ride cycles to determine that the ride speed does not exceed the speed specified in the information plate, ride manual field inspection guide of specification sheet.

Daily pre-opening inspection

This inspection shall include a daily inspection of all items as specified in the previous item (erection or installation testing).

and groups in terminal groups () and
Documented field performance and operational testing Documentation and certification shall be performed by a person who by demonstrated education and field experience is knowledgeable with construction, erection, operation, maintenance and repair of amusement rides.

Operational load testing

Any operational test including load testing performed on a ride shall be completely non-destructive in nature. Overload testing exceeding the rated limits listed on the information plate, operation manual, field inspection guide or specification sheet shall be deemed inappropriate. Where maximum total passenger weight is not readily available, passenger capacity multiplied by 170 pounds per adult and/or 90 pounds per child may be used.

Non destructive testing with inert loads can be accomplished only with special care as to placement of the load so that it is centered both vertically and horizontally as would be the load of the passenger it replaces. Extra seat reinforcement must be used to offset any load concentration created. Such tests shall be documented and certified as non-destructive by the person making the test and the agency requiring it. Results of all load tests shall be communicated to the factory upon completion by the certifying agency.

Conducting a non-destructive operational load test assures the testing agency only that it will carry a given load in a given way at a given moment and in no way assures future safety of the ride.

Conducting a destructive load or overload test also assures the testing agency that it will carry a given load in a given way at a given moment and in no way assures future safety of the ride. However, it also introduces the probability of inflicting serious irreparable damage to the ride that may or may not be apparent at the time of the test.

CHANCE RIDES, INC. considers inert load testing of any nature appropriate only for situations requiring experimental development of stress-strain testing during prototype development. A certificate of load test on the prototype and certification that each production ride met the design criteria when it was manufactured is available from the factory upon request.

Non-destructive testing⁷

REFERENCE 1. ASTM-F24 Standard On STANDARD Amusement Rides And Devices

a. F846-86 Testing Performance Of Amusement Rides b. F853-86 Maintenance Procedures For Amusement Rides And Devices c. F893-87 Inspection Of Amusement Rides And Devices

CHANCE RIDES, INC., at the time of design and manufacture, determines by calculations and testing of a prototype amusement ride the appropriateness for use, of not only the parts, but the entire system of a newly designed ride. These calculations and tests are utilized to, as feasibly as possible, determine the requirements for expected design life of major components. Based on this design criteria, CHANCE RIDES, INC. does not identify critical components on amusement rides to be singled out for non-destructive testing.

If through field experience, there is an indication that a structural or mechanical problem may develop on rides currently operating, CHANCE RIDES, INC. will notify owners by bulletin of the recommended procedures to inspect and correct the possible problem. Any possible defect which could affect the continued safe or proper operation of the ride should be reported immediately to the manufacturer by the owner/operator. This information is necessary so that a determination can be made for either the repair or replacement of the possible defective parts.

Field repairs should not be undertaken without the approval and proper instructions from the manufacturer and should be performed by qualified personnel. These persons should have a complete understanding of both the component's function and the manufacturer's instructions.

It is the responsibility of the individual inspector to thoroughly inspect the ride as he deems necessary based on his knowledge and field experience and manufacturer's recommendations. If the inspector finds an area or component that could be a problem, structural or otherwise, the factory should then be notified. It is then the responsibility of the inspector to ensure that the manufacturer's recommendations for repair,

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replacement or otherwise have been completed and are in compliance with the required specifications.

Load testing is a destructive form of testing and is not recommended by the manufacturer, as per previous topic "Field performance testing of amusement rides."

Fasteners

Capscrews

Capscrews used by CHANCE RIDES, INC. are classified as functional load-carrying capscrews if:

• They are used as tension members in the erection or operation of the ride

and/or

• The are required to resist shear through friction-type connections in the erection or operation of a ride.

Capscrews are selected with consideration to grade, size and quantity, using joint capacities based on tightness torques of 60% rated yield and group joint efficiencies of 62.5%

Torque requirements14

Capscrews must be tightened to the torque values listed in the torque chart. These values were selected to produce a tightening torque range of 60% to 70% of proof load, when tightened with a hardened washer under the nut or capscrew head (whichever is accessible for tightening). When the capscrew is tightened from the head end, apply anti-seize lubricant to the shank end of the capscrew. When the threads are lubricated, use 10% less torque to tighten the capscrew.

DO NOTTIGHTEN CAPSCREWS OVER THE RECOMMENDED TORQUE. This can damage the capscrew, due to variances in coefficients of friction and torque wrench accuracy.

Always use a torque wrench. It is impossible to accurately measure the tightness of a capscrew by other methods. Torque wrenches must be checked for accuracy twice each operating season.

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	Foot pound torque range (see notes 1 and 2) with locknut and hardened washer	
Size Diameter - Threads/inch	SAE J429 Grade 5 ASTM A325	SAE J429 Grade 8 ASTM A490
1/4 - 20	5-6	7-8
1/4 - 28	6-7	8-10
5/16 - 18	11-13	15-18
5/16 - 24	12-15	17-21
3/8 - 16	19-24	27-33
3/8 - 24	22-27	31-38
7/16 - 14	30-35	45-55
7/16 - 20	35-40	50-60
1/2 - 13	50-60	65-80
1/2 - 20 -	55-65	75-90
5/8 - 11	95-115	130-160
5/8 - 18	105-130	150-180
3/4 - 10	165-200	235-285
3/4 - 16	185-225	260-320
7/8 - 9	270-325	380-460
7/8 - 14	295-360	415-505
1 - 8	400-490	565-690
1 - 12	440-535	620-755
1 1/8 - 7	495-600	800-975
1 1/8 - 12	555-675	900-1095
1 1/4 - 7	700-850	1135-1380
1 1/4 - 12	775-940	1255-1525
1 1/2 - 6	1215-1480	1975-2395
1 1/2 - 12	1370-1660	2220-2700

Torque chart

Torques for functional load carrying cold finished hex head capscrews with dry rolled threads, used with locknuts (see note 3), and tightened with an ASTM A325 hardened washer under the capscrew or locknut head (whichever is accessible for tightening).

This torque range will develop 60% to 70% of proof load.

Refer to Replacement of capscrews and locknuts for conditions requiring replacement

NOTES

- 1.Use anti-seize lubricant on capscrew shank when tightened from head end.
- 2. Use 10% less torque when antiseize or other lubricant is used on threads.
- 3. Use same torque range for holes tapped in steel.

Capscrew grades

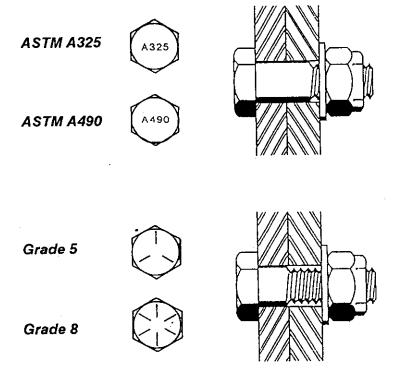
CHANCE RIDES, INC.uses only grade 5 or better capscrews and grade 8 locknuts, with A325 hardened washers for functional loads. The *Grade markings chart* shows the capscrew markings to be found on CHANCE rides. The manufacturer's identification symbols must be present on all functional load carrying capscrews.

CHANCE RIDES, INC. requires the use of cold-formed hex head capscrews with rolled threads. Hex bolts and hot formed hex head capscrews are not recommended because they may have machined threads and can have die seams along the shank.

NEVER REPLACE CAPSCREWS OR NUTS WITH PARTS OF A LESSER GRADE, OR DIFFERENT LENGTHS THAN THOSE SHOWN IN THE CHANCE PARTS CATALOG.

Grade markings for functional load carrying capscrews
Manufacturer's identification symbols must be present on all capscrews

Correct marking	3	Examples of unacceptable markings
SAE J429 Grade 5 Medium carbon 81,000 yield		Grade 5.1 Low carbon martensitic
ASTM A325 Type 1 Medium carbon Longer shank and shorter thread length than Grade 5 81,000 yield ASTM A325 Type 3 Corrosion resisting Longer shank and shorter thread length than Grade 5 81,000 yield	A325 A325	ASTM A325 Type 2 Low carbon martensitic
SAE J429 Grade 8 Medium carbon 130,000 yield		ISO R898 Class 8.8 Medium carbon 92,000 yield
ASTM A490 Alloy steel Longer shank and shorter thread length than Grade 8 130,000 yield	A490	ISO R898 Class 10.9 Alloy steel 130,000 yield



Capscrew comparison
ASTM A325 and A490 capscrews
have longer shanks and shorter
threads then Grade 5 and Grade 8
capscrews of the same size.

Replacement of capscrews and locknuts

When permanently installed capscrews and locknuts are disassembled for repair or adjustment, they must be replaced if they have been in service over five (5) years, or corrosion, or other damage requires over-torquing for removal. If a torque wrench is not used to measure excessive removal torques, the capscrews and locknuts must be replaced.

Capscrews and locknuts which are frequently disassembled for portability must be replaced each operating season. If the capscrews and locknuts become damaged, corroded or require excessive torque for removal, they must be replaced. If a torque wrench is not used to measure excessive removal torques, the capscrews and locknuts must be replaced.

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Pins¹¹

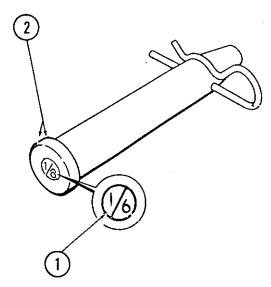
Tapered pins used on amusement rides are subject to deterioration due to improper use and wear. CHANCE RIDES, INC. specifies certain pins for certain applications on amusement rides. These pins have been developed over a period of years, taking into account size, design, material and hardness characteristics.

Use only the pins specified by CHANCE RIDES, INC. These pins are identified as shown in the following illustration. Always use the correct hairpin.

Pin identification
1. Date of manufacture

Property of the second of the

2. Rounded edges

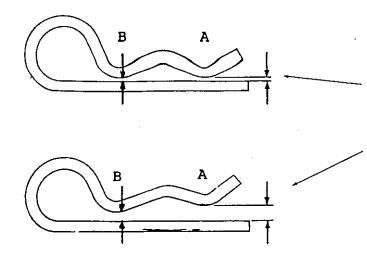


Use care when installing and removing tapered pins. Since these pins are hardened (as are hammers and punches) care must be taken to strike the pin straight on. Striking a pin at an angle can cause the pin to chip, resulting in personal injury. For this reason APPROVED SAFETY GLASSES OR GOGGLES MUST BE WORN AT ALL TIMES when tapered pins are being installed or removed. If a tapered pin is chipped, bent, or "mushroomed" on either end, discard it and replace it with a new pin.

Pin keepers

All keepers (R-keys, hair pins, lynch pins, etc.) must be inspected for wear. If a keeper is bent out of shape or "sprung", it must be replaced.

Hairpins are expendable parts. After repeated use, they become worn and "sprung" as shown.



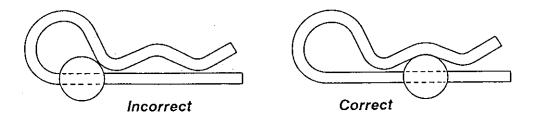
Acceptable hair pins

Dimension "A" equals dimension "B" in a relaxed position

Unacceptable hair pins
Dimension "A" is greater than
dimension "B" in a relaxed position

NEVER ATTEMPT TO BEND A HAIR PIN BACK INTO SHAPE. REPLACE IT WITH A NEW PART.

The correct installation of a hairpin is shown. Incorrectly installed hairpins are more likely to fail, and will distort after only a few uses.



CHANCE RIDES, INC. recognizes and recommends the safety procedures specified in ASTM Standards F770 Operation Procedures for Amusement Rides and Devices and F853 Maintenance Procedures for Amusement Rides and Devices.

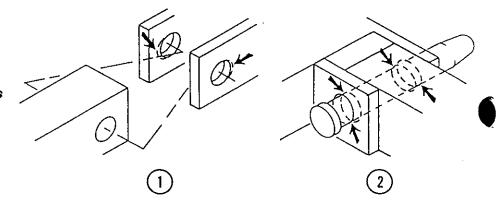
Inspection

Joint inspection

Some joints will appear to wear rapidly on new rides. This is usually a result of the holes not aligning in the mating parts. When this condition occurs it results in "point contact". A joint with this condition will generally wear rapidly until the load is distributed evenly over the fastener and the parts.

If in doubt about the condition of a bolt, pin or hole on a new ride consult CHANCE RIDES, INC., and replace as required.

1. Inspect stationary joints for "egg-shaped" wear and loose pins.



- Stationary joint wear
 Stationary joint-misaligned by
- 2. Stationary joint-misaligned holes resulting in point contact

- 2. Inspect moving joints for wear and lubrication.
- 3. Inspect welded structural joints for cracking or fatiguing.
- 4. Inspect bolted structural joints for cracking, fatiguing and proper bolt tightness.
- 5. Inspect pins and keepers on all pin joints for wear and proper installation.
- 6. Inspect all pins for proper CHANCE identification marks.

Cable inspection

Inspection of drive cables and cables which support the ride during operation¹³

Replace cables if any of the following conditions exist. If more than one cable is used, cables must be replaced as a set.

- 1. Severe corrosion
 - a. Rust appearing to stem from interior of cable.
 - b. Cable appears clean but previous corrosion is evident from pitted condition in wires.
- 2. Severe stretching occurring in a short section of cable, indicated by a marked reduction in the diameter of the cable.
- 3. Severe physical damage such as kinking, crushing or "bird caging".



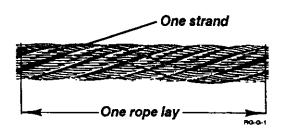




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- 4. One strand being 75% broken through.
- 5. A number of wires, equal to the number in a strand, broken in the length of one rope lay.

"Lay" as a unit of measure



- OSHA 1926-550 Subpart N Cranes, derricks, hoists, elevators and conveyors
- ANSI B30.5

5-2.4.3 Rope Replacement

5-2.4.4 Rope Maintenance

Chance Rides, Inc. recognizes the above listed standards with regards to cables (wire rope) used for rigging, slings, and hoists for the purposes of setup and/or tear-down of an amusement ride. It is further recognized the no precise rules can be given to determine the exact life expectancy of any given cable, due to the variables to which that cable may be subjected. Continued use of a cable depends on the judgement of the individual who is authorized to evaluate the cable.

Chance Rides, Inc. requires that prior to each setup or teardown of an amusement ride, the owner's authorized representative inspect and evaluate all cables. Cables must be replaced if any of the following conditions exist.

- 1. Six randomly distributed broken wires in one lay;
- Three broken wires in any one strand in one lay;
- 3. Wear of one-third the original diameter of outside individual wires:
- Physical damage such as kinking, crushing, "bird caging", or any other damage resulting in distortion of the cable structure;
- 5. Damage due to heat of any kind;
- 6. Reductions from the nominal cable diameter of more than any of the following:

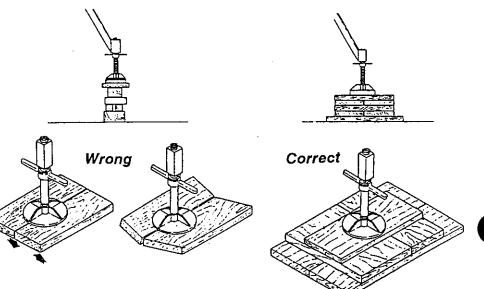
NOMINAL CABLE DIAMETER	MAXIMUM REDUCTION
5/16" and smaller	1/64"
3/8" to 1/2"	1/32"
9/16" to 3/4"	3/64"
7/8" to 1-1/8"	1/16"
1-1/4" to 1-1/2"	3/32*
,, .	-,

Leveling and blocking (portable models)

- 1. Inspect leveling and blocking at each set up and at the start of each day (rides erected in soft locations require more frequent inspection).
- 2. Inspect for proper cross blocking or crib blocking. Cross blocking distributes weight evenly.

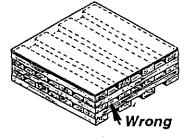
Always cross block Cross blocking distributes weight evenly.

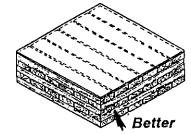
Recommended blocking: 3 X 12 X 36" and 3 X 12 X 24" unless otherwise noted.



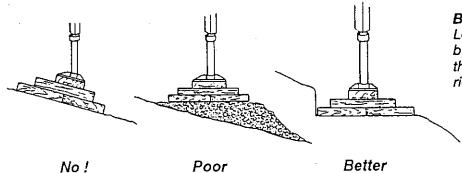
To avoid crushing under load "crib" blocking should be spaced no more than 1/4" for drainage.

"Crib" blocking Large voids can let blocking crush under load. 1/4" spaces allow adequate drainage.



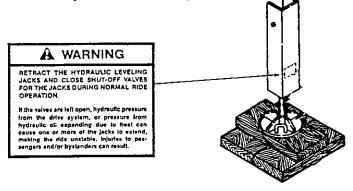


- 3. Inspect blocking for proper contact with ground.
- 4. Level ground under blocking.by digging where possible, instead of filling. Fill dirt will be soft and allow settling.

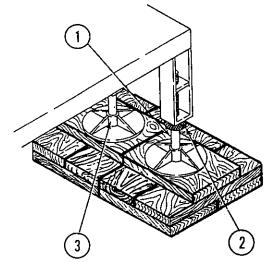


Blocking on a slope Level the ground beneath blocking by digging where possible. Don't fill, the fill dirt will be soft allowing the ride to tilt

5. Inspect hydraulic leveling jacks for leaks at every set-up. The hydraulic jacks are for leveling purposes only. They must be retracted and their shut-off valves closed during normal ride operation. Likewise, they must be fully retracted and their shut-off valves closed before transporting the ride. Check for placement of safety decals on each jack⁸.



6. Check the lock rings on all screw jacks for tightness.



- 1. Screw jack
- 2. Locking ring
- 3. Hydraulic leveling jack

General safety guidelines

The following is a list of general safety rules to which everyone should adhere.

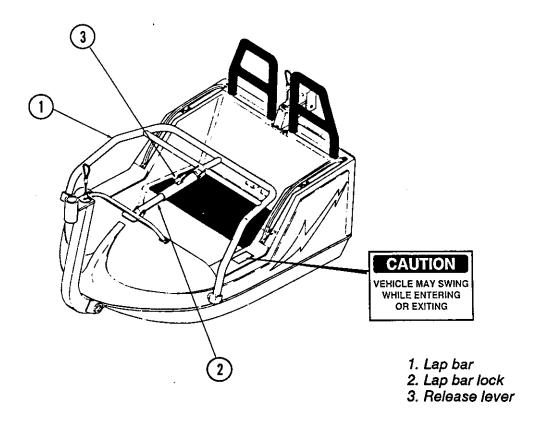
- 1. All work must be performed by competent, qualified mechanics, capable of understanding the function of the parts and their proper installation.
- 2. Inspect the ride before each day of operation to determine that no portion of the ride is damaged, missing or worn in such a manner that unsafe conditions can develop.
- 3. Perform the manufacturer's recommended maintenance procedures at the intervals and in the manner specified in the operation and maintenance manual.
- 4. Study each job carefully to determine all hazards so that necessary safety precautions can be taken.
- 5. Examine safety devices (tools, ladders, etc.) before they are used to make sure they are in good condition. Use only OSHA approved safety items. Ladders must be clean and unpainted.
- 6. Use the proper tool or equipment for each job. All hand electric power tools must be properly grounded.
- 7. Wear close fitting, comfortable clothing when working on or near moving parts or live electrical circuits. Avoid finger rings, jewelry or other articles which can be caught in moving parts or come in contact with electrical circuits.
- 8. Protect your eyes by wearing approved safety glasses or goggles.
- 9. Wear a hard hat at all times. When working in elevated areas, use a safety belt.
- 10. Where work performed is hazardous, never work alone.
- 11. If guards are removed from equipment, make sure they are replaced before leaving the job.
- 12. Clean up after each job, disposing of surplus materials.
- 13. Keep a record of parts replaced and the date of replacement. Inform the manufacturer of any replacement requirements which are frequent or cause unsafe conditions.

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14. Make modifications and additions only as outlined in manufacturer's service and safety bulletins.

Vehicle inspection

1. Check the operation of the lap bars, lap bar locks and release levers. Inspect overall condition and appearance of lap bars. Inspect vehicle safety decal¹⁷.

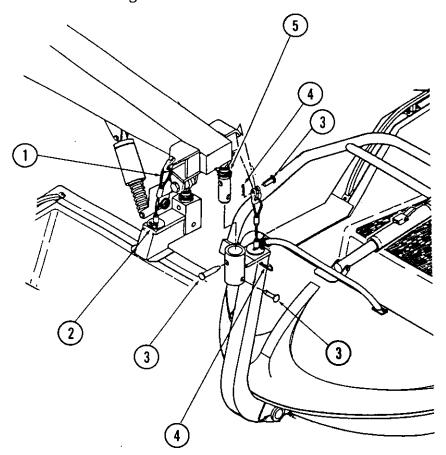


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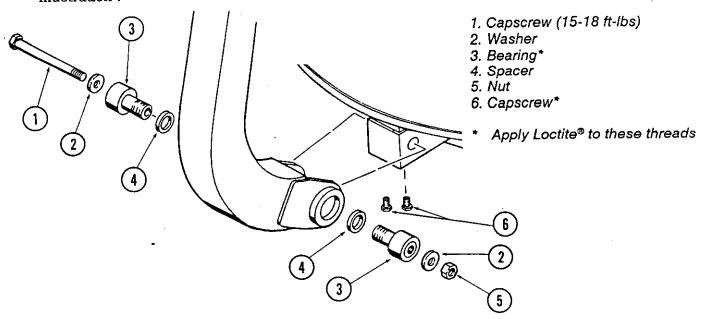
1. Cable 2. Cable lock

3. Pin 4. Hairpin 5. Jam nut 2. Inspect vehicle attachment at both front and rear of each vehicle. Pins and hairpins must be in place and the lock nut must be tight.

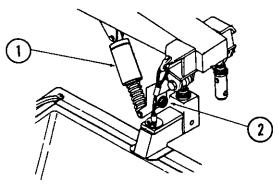


- 3. Inspect vehicle hangers (especially the rod end) weekly or at every set-up. Look for signs of wear, cracks, bends or damaged threads. The rod end is not serviceable separately.
- 4. Inspect the cables which run through the vehicle frame daily, especially around the cable locks and in the vehicle frame pivot area. Check for signs of fraying and crimping. Repaired or spliced cables are not acceptable.
- 5. Check the installation of cable locks to hold the cables securely in position.
- 6. Inspect the vehicle frame structures for cracks, bends and other damage, especially in the pivot area. Look for distorted holes, and make sure the bearings turn freely.

7. Inspect the frame pivot bearings. Bearings must turn freely, and be installed with the hardware shown. Green Loctite's sealant must be applied to the areas noted in the illustration5.



8. Inspect overall vehicle appearance, including the flooring and seat mats. Exterior abrasions can indicate vehicle oscillation problems. A back brace for the fiberglass back rest area is optional on ride serial numbers 392-00886 through 392-01086, and standard equipment thereafter4.



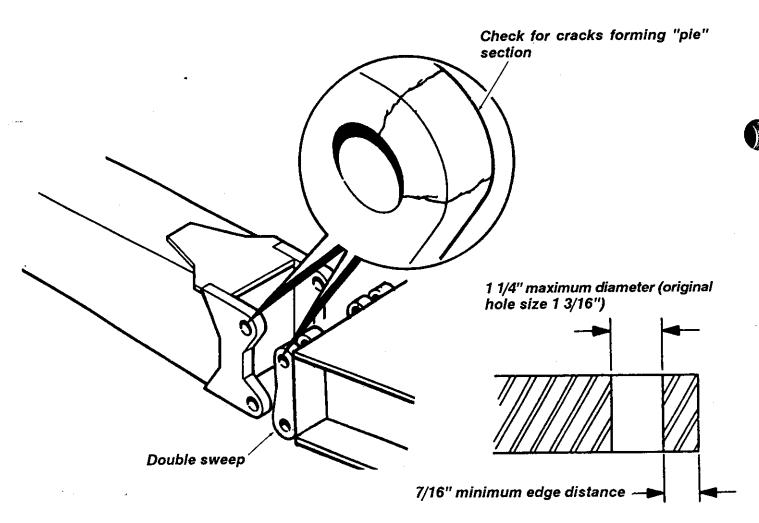
- 9. Inspect the shock absorber and rubber bumper for each vehicle. Check the operation and adjustment of the shock absorbers (initial setting is at 2-1/2). The shock should not bottom when the vehicle is pushed in with moderate force. If the shock bottoms, turn setting down in 1/2 setting increments.
- 1. Shock absorber
- 2. Rubber bumper

B392R1015-0 June 30, 1987

B392R1016-0 September 9, 1987

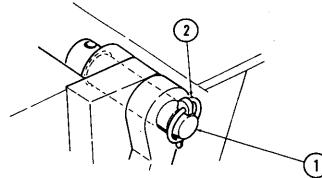
Sweep inspection

1. Inspect the attaching ears on all sweeps and double sweeps. Check for cracks and wear as shown¹². Cracked attaching ears MUST be replaced with new parts, do not weld ears.

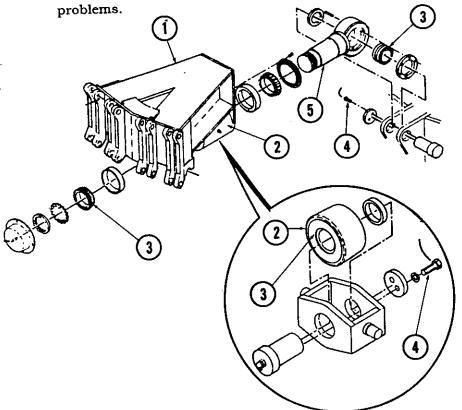




And the processing of the plants of the control of



- 1. Pin 2. Lynch pins
- 3. Inspect sweep rollers for lubrication and even contact with track. Uneven contact can indicate spreader bar adjustment



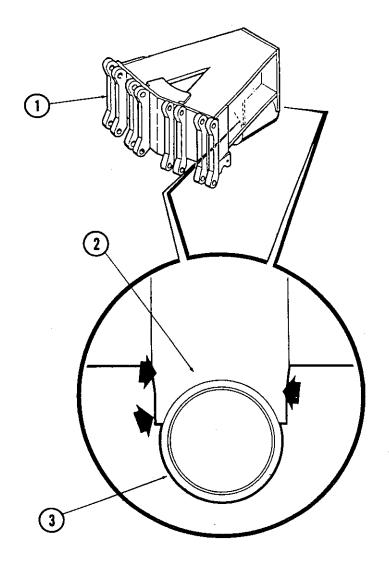
- 1. Roller cradle assembly
- 2. Sweep roller
- 3. Bearings
- 4. Roller shaft capscrew
- 5. Sweep spindle

4. Inspect the bearings and capscrews in the roller cradle assemblies. Check performance of rollers at low speed. Check safety wires in the roller shaft capscrews.

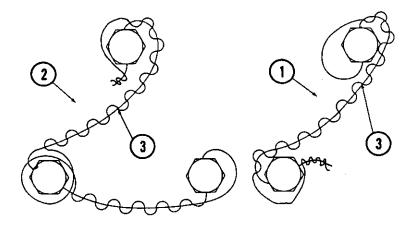
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- 5. Inspect the double sweeps for cracks around the bearing housing support plates every 30 days using the following procedure¹⁶:
 - Thoroughly clean all areas to be inspected. All areas must be free of grease and other foreign materials which could hamper inspection.
 - Visually inspect all areas as indicated on the illustration below.
 - This inspection must be done every 30 days or at each set-up, whichever occurs first.

- 1. Double sweep
- 2. Bearing housing support plate
- 3. Bearing housing



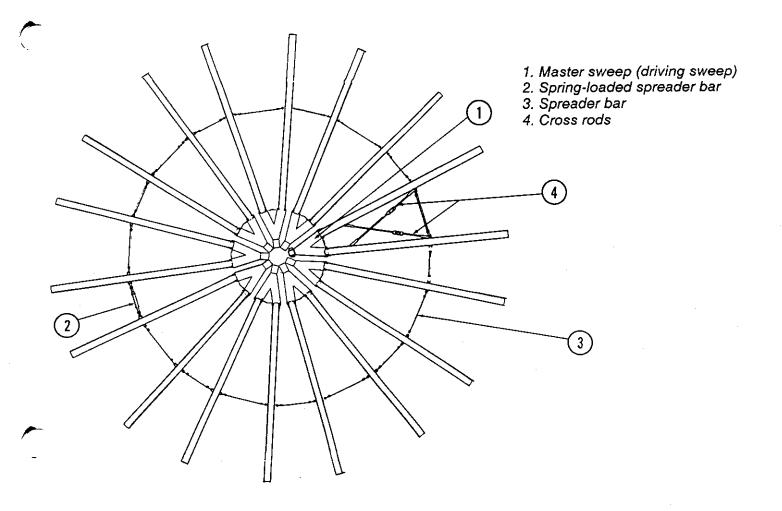
6. Inspect double sweeps for safety wire in sweep spindle shafts.



Safety wire installation1. Two bolt pattern

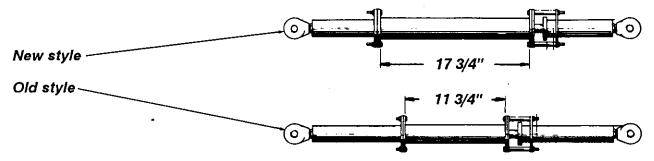
- Three bolt pattern
 Safety wire

7. Check the installation of cross rods.



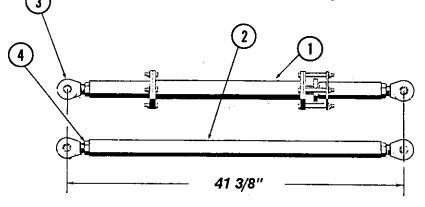
Spreader bar inspection

1. Inspect spreader bars for equal length spreader bars. Unequal length spreader bars are no longer acceptable⁹. All units MUST have the "new style" spreader bar.



- 2. Inspect spring loaded spreader bar for proper configuration as shown9.
- 3. Check adjustment of spreader bars monthly or at every setup, using the following procedure²:
 - a. Inspect all spreader bars and their attaching ears for cracks or bends. Inspect the spreader bar rod ends and the bushings in the attaching ears for wear or damage. Check the condition of all pins and hairpins.

- 1. Spring-loaded spreader bar
- 2. Spreader bar
- 3. Rod end
- 4. Jam nut



b. With all spreader bars removed from the ride, including the spring loaded spreader bar, loosen all jam nuts (two on each spreader bar). c. Measure the length between the rod ends, center-to-center, on all spreader bars, including the spring-loaded spreader bar. This measurement must be 41-3/8 inches. Adjust the rod ends, but do not tighten the jam nuts at this point. THIS LENGTH IS USED AS A "BASE-LINE" MEASUREMENT ONLY, AND MUST BE ADJUSTED AS REQUIRED IN THE FOLLOWING STEPS.

IMPORTANT: Both rod ends must be threaded into the spreader bars an equal number of turns. Always adjust both rod ends equally, within one-half turn.

d. Install the spreader bars on the ride, using the correct pins and hairpins.

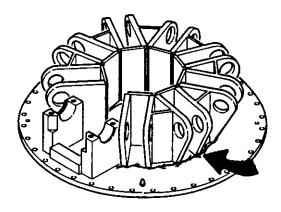
NOTE: The spring-loaded spreader bar must be installed 180° from the master sweep (driving sweep).

1. Master sweep (driving sweep) 2. Spring-loaded spreader bar 3. Spreader bar

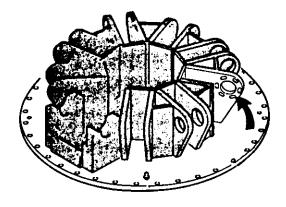
e. The vehicles must be installed to properly adjust the spreader bars. If the vehicles are not on the ride, install them at this time.

Center hub inspection

1. Inspect center hub base plate for cracks near the points at which the spindle ears are welded.



2. Check the inside surfaces of all spindle ears for circular gouges or other indication of contact with the spindles. Spindle contact can indicate spreader bar adjustment problems.



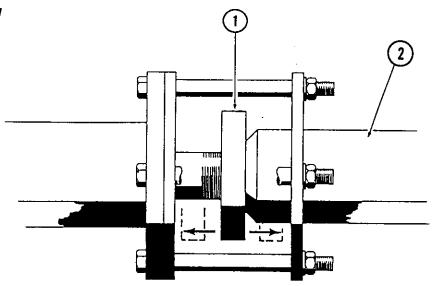
Circular gouges

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f. Rotate the ride counter-clockwise at least one complete revolution by hand, using two or three men. As the ride turns, watch the indicator ring on the spring-loaded spreader bar, as the spreader bar extends and retracts. The indicator ring must travel the same distance from "neutral" in both directions.

Indicator ring travel must be equal in both directions

- 1. Indicator ring
- 2. Spring loaded spreader bar



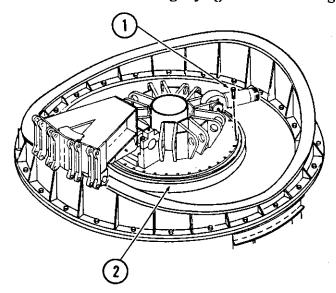
g. If the travel is equal in both directions, tighten the jam nuts on all spreader bars. If the travel is not equal in both directions, adjust the length of each spreader bar (either longer or shorter) by turning the rod ends. ALL SPREADER BARS, INCLUDING THE SPRING-LOADED SPREADER BAR, MUST BE THE SAME LENGTH. If one spreader bar is adjusted to a longer length, ALL spreader bars must be lengthened by the same amount. Repeat Steps f. and g. until the travel is equal.

h. As a final check, get into the vehicle closest to the spring-loaded spreader bar. Observe the action of the spring-loaded spreader bar during normal ride operation, at both low and high speeds. If the indicator ring travel is equal in both directions, the adjustment is satisfactory.

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3. Check the capscrews which attach the center hub to the bearing and the bearing to the frame weekly or at each set-up. These are $5/8-11 \times 2-1/4$ Grade 8 capscrews. Check for 130 to 160 ft-lbs. torque on these capscrews. When all capscrews are tightened, visually check the edge of the center hub base plate to be sure it is drawn tightly against the bearing.

- 1. Centerhub-to-bearing capscrews
- 2. Bearing-to-frame capscrews

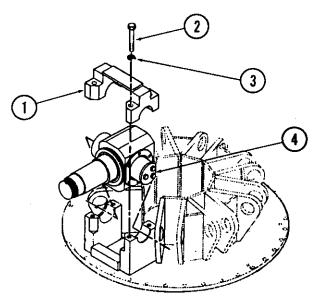


4. Check the capscrews which attach the master sweep bearing cap weekly or at each set-up.

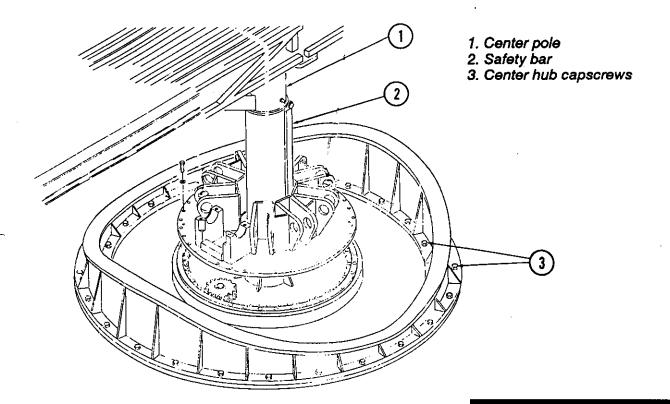
These are 7/8-9 x 4-1/2 Grade 8 capscrews with a hardened washer. Check for 460 ft-lbs. torque on these capscrews⁶.

Master sweep bearing cap

- 1. Bearing cap
- 2. Capscrew
- 3. Hardened washer
- 4. Safety wire



- 5. Check the capscrews which attach the track to the center hub. These are 3/4-10 Grade 5 capscrews with a hardened washer. Check for 165 to 200 ft-lbs. torque on these capscrews.
- 6. Check installation of safety bar on center pole.



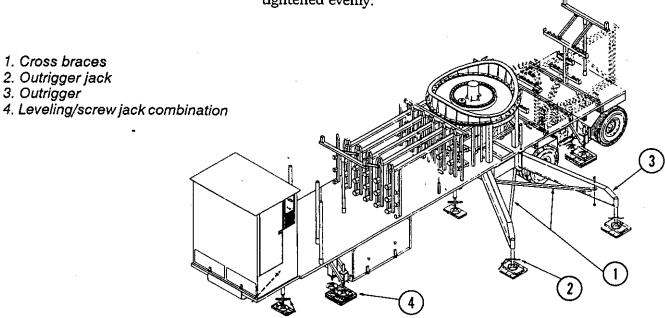
Electrical and lighting inspection

- 1. Inspect cable leads, electrical connections and grounding per local code.
- 2. Test the operator controls, including stop switch and power switch.
- 3. Inspect all quartz flood lights for installation of special clear tape on outside of lens²⁰.

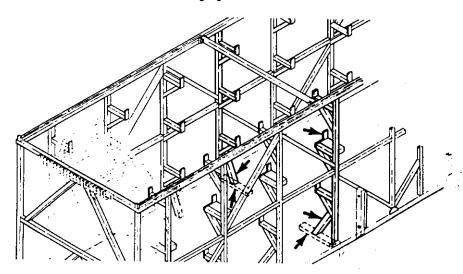
1. Cross braces 2. Outrigger jack 3. Outrigger

Trailer inspection

1. Inspect trailer outriggers. Outrigger braces must be fastened with Grade 5 capscrews. Screw jacks must be tightened evenly.



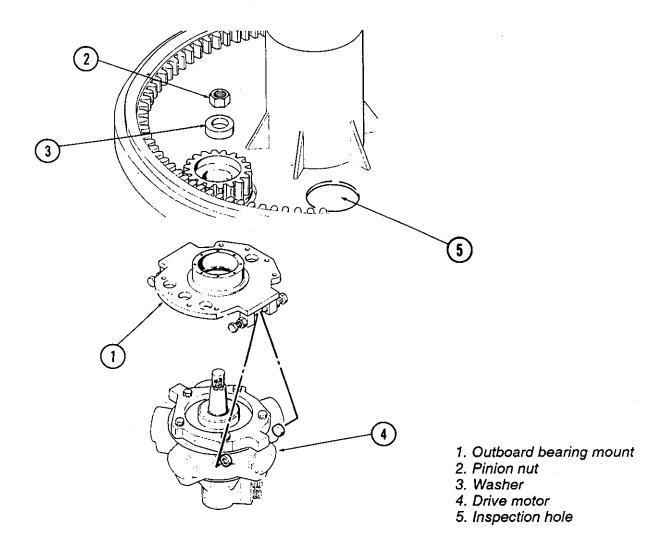
2. The reinforcing braces shown for the auxiliary trailer are optional on ride serial numbers 392-00886 through 392-01486, and standard equipment thereafter3.



Auxilliary Trailer racking

Drive inspection

- 1. Inspect the entire hydraulic system including hoses, tubes, fittings and other components for leaks.
- 2. Inspect the drive motor mount. All rides must be equipped with the outboard bearing mount shown 8 .

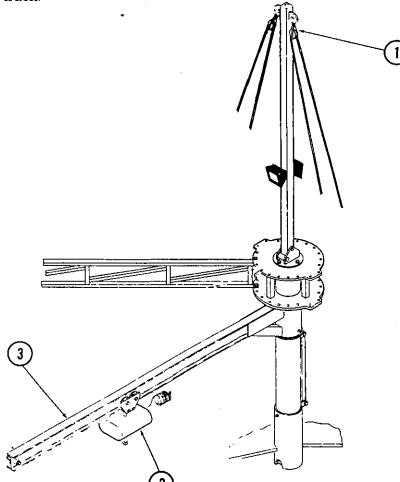


Platform and fence inspection

- 1. Inspect hand rails, ramps, steps and walkways.
- 2. Inspect all gates and queue line chains. Self-closing exit gates must operate properly.
- 3. Exit gates must read "EXIT ONLY". Check entrance signs (if equipped).
- 4. Inspect floors and jackstands for proper installation and leveling.

Material handling equipment inspection

- 1. Inspect the general condition of all chains, cables, winches and rigging. Look for broken, worn or missing parts.
- 2. Inspect block and tackle for tent top and sign. The rope must not be cut or frayed.
- 3. Check for proper operation of the sweep hoist, and crane jib.
- 4. Check for proper operation of the vehicle hoist, trolley and track.



- 1. Tent top block and tackle
- 2. Sweep hoist
- 3. Crane jib

Bibliography

The following service bulletins and manuals are referenced in the preceding text. Service bulletins issued after publication of this guide are located at the back of each section. Any future bulletin releases affecting a ride will be provided by CHANCE RIDES, INC. Bulletins received after receipt of this guide should be considered updates to this guide.

CHANCE RIDES, INC. 4219 Irving P.O. Box 12328 Wichita, KS 67277-2328

Thunderbolt Operation And Maintenance Manual 24326800 March, 1986

- Field Performance Testing Of Amusement Rides B090R1002-0 May 14, 1986
- Installation, Inspection And Adjustment Of Spreader Bars B392R1004-A December 31, 1988
- 3. Auxiliary Trailer Rack Rework B392R1010-0 June 30, 1987
- 4. Vehicle Back Brace B392R1015-0 June 30, 1987
- 5. Vehicle Frame Pivot Modification B392R1016-0 September 9, 1987
- 6. Master Sweep Bearing Cap Rework (capscrews) B392R1020-0 March 21, 1988

Thunderbolt Field Inspection And Test Guide 41 Revised 1992, 1994

Track and the same

7. Non-destructive Testing B090R1022-0 March 21, 1988

 Operation Of Shut-off Values For Hydraulic Leveling Jacks B392R1023-0 November 28, 1988

 Spreader Bar Inspection And Rework B392R1027 December 31, 1988

10. Hydraulic Motor Mount Rework B392R1042-0 July 12, 1989

 General Safety - Taper Pins B090R1056-0 February 9, 1990

12. Sweep Ears B392R1006-0 May 22, 1990

13. Cable Inspection B090R1071-0 May 25, 1990

14 Replacement And Torque Requirements For Functional Load Carrying Capscrews B090R1075-0 May 25, 1990

15. Safety Decal B090R1083-0 August 17, 1990

16. Double Sweep Inspection B392R1089-0 December 15, 1990

17. Load / Unload Safety Decal B392R1091-0 February 28, 1991

42 Chance Rides, Inc.

Revised 1994

- 18. Manufacturer's Specifications B090R1126-0 March 12, 1993
- 19. Cable Inspection B090R1128-0 April 28, 1993
- 20. Flood Light Safety B090R1133-0 August 6, 1993

44 Chance Rides, Inc.
Revised 1994



Fax

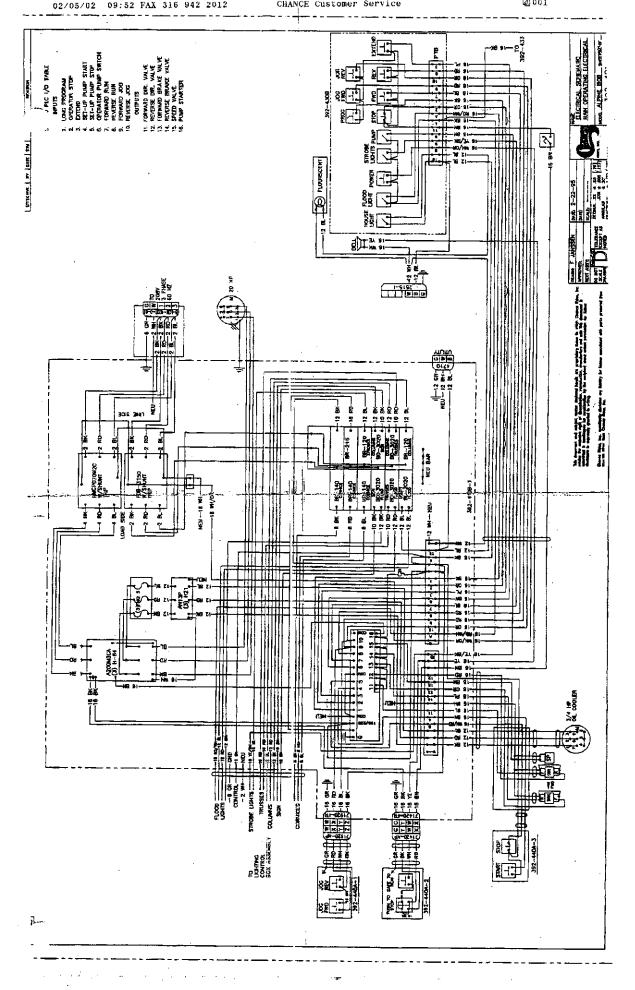
To:	Kevin Exum	From: Steven Laycock
	Murphy Brothers	800-242-6231 ext. 2293
Fax:	813-740-4360	Pages:
Phone:		Date: 02/05/02
Re:	THUNDERBOLT	cc:

The is to verify that I have been informed of an indication in the weld that secures the ear to the double sweep on the above noted amusement ride. As long as the indication is only in the weld, a field fix of repairing the weld without replacing the ear can be done.

The following process must be used:

- The old weld where the indication is must be removed.
- 2. Verify that the indication has been removed using an appropriate nondestructive testing method.
- 3. Pre-heat area to 200 degrees.
- Using E7018 welding filler material, a certified welder can weld the area to be repaired. Be sure that no stop or starts occur at a corner, blending all notches etc. as required.

If you have any questions regarding this information, please feel free to contact me.





NUMBER: B392R1091-0

DATE: FEB. 28, 1991

SUPERSEDES:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Number:

All Units - Chance Rides, Inc.

All Units - Chance Manufacturing Co., Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with rides produced by Chance Manufacturing Company, Inc.

Ride: THUNDERBOLT

Subject: Load/Unload Safety Decal

Chance Rides, Inc. has become aware that the vehicles on the THUNDERBOLT amusement ride may suddenly swing or shift while passengers are loading or unloading. This swing or shift is due to the passenger's weight on one side of the vehicle, placing the vehicle in an out-of-balance condition. <u>ALL OPERATORS MUST VERBALLY CAUTION PERSONS OF POSSIBLE VEHICLE MOVEMENT AS THEY ENTER AND EXIT FROM THE VEHICLES.</u>

A safety decal has been developed to help alert persons of possible vehicle movement as they enter and exit the vehicle. Chance Rides, Inc. requires all owner/operators of THUNDERBOLT rides to order and install one of these safety decals on each of the vehicles. A total of 18 decals are required for one ride. Order part number 22198506 and install as shown on this bulletin.

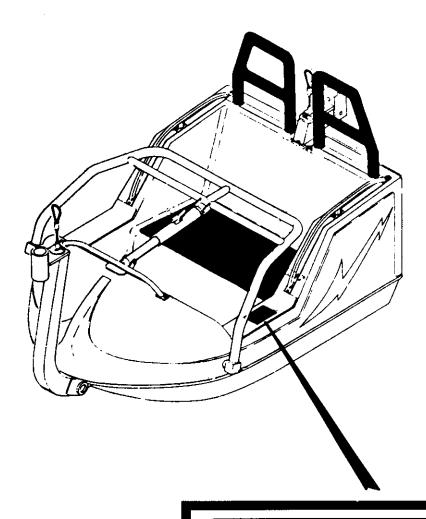
Complete the attached Certification Of Compliance and return it to Chance Rides, Inc. within fifteen (15) days from the receipt of the decals.

All work must be performed by qualified personnel, capable of understanding the function of the parts and their proper installation.

NOTICE

Use only those components authorized, specified or provided by Chance Rides, Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with any unauthorized alterations and/or modifications or additions and installations of unauthorized components.



CAUTION

VEHICLE MAY SWING WHILE ENTERING OR EXITING



NUMBER: B337R1090-0

DATE: DEC. 15, 1990

SUPERSEDES:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Number: All Units - Chance Manufacturing Co., Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with rides produced by Chance Manufacturing Company, Inc.

Ride: FLYING BOBS Subject: Double Sweep Inspection

Chance Rides, Inc. requires all owners of FLYING BOBS amusement rides to inspect the double sweeps for cracks around the bearing housing support plates. Inspection must be done as shown in the illustration on this bulletin. If the plate cracks, failure of the part could occur, resulting in possible injury to passengers.

If any cracks are found, contact the Chance Rides Customer Service Department. DO NOT ATTEMPT TO REPAIR OR WELD. DO NOT OPERATE the ride until the Chance Rides, Inc. approved repair rework kit number K337R1090-0 has been properly installed. If no cracks are found during inspection, the kit is not required.

All work must be performed by qualified personnel, capable of understanding the function of the parts and their proper installation.

NOTICE

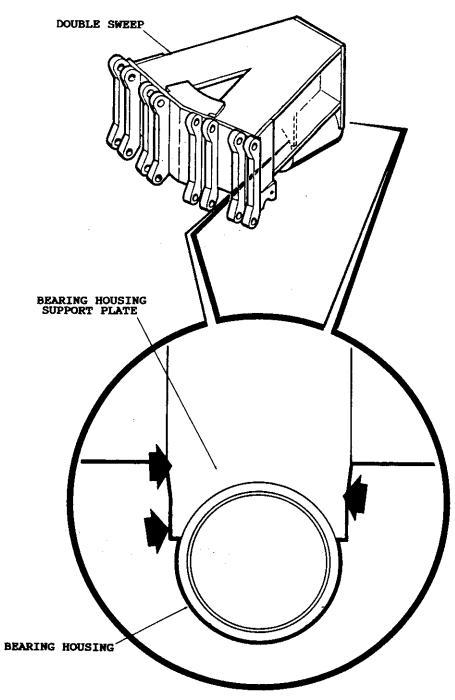
Use only those components authorized, specified or provided by Chance Rides, Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with any unauthorized alterations and/or modifications or additions and installations of unauthorized components.

Factory and Sales Office: 4219 Irving P.O. Box 12328 Wichita, Kansas 67277-2328 (316) 942-7411 FAX: (316) 942-7416

INSPECTION PROCEDURES

- 1. Thoroughly clean all areas to be inspected. All areas must be free of grease and other foreign materials which could hamper inspection.
- 2. Visually inspect all areas as indicated on the illustration below.
- 3. This inspection must be done every 30 days or at each set up, whichever occurs first.



B337R1090-0 PAGE 2 OF 2



NUMBER: B392R1066-0

DATE: May 22, 1990

SUPERSEDES:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Number:

All Units - Chance Rides, Inc.

All Units - Chance Manufacturing Co., Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with rides produced by Chance Manufacturing Company, Inc.

Ride: THUNDERBOLT

Subject: Sweep Bars

Chance Rides, Inc. requires all owners of THUNDERBOLT amusement rides to inspect the ears on the sweeps and on the double sweeps for cracks as shown in the illustration on this bulletin. If the ears crack, failure of the part could occur, resulting in injury to passengers.

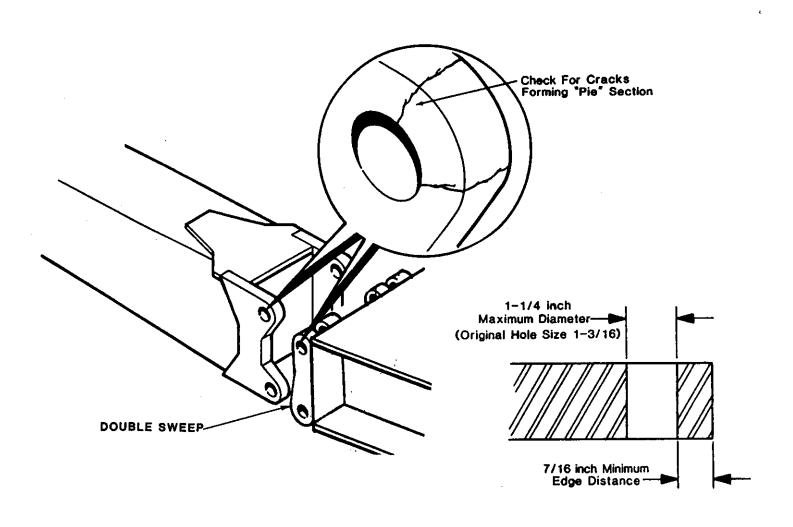
If any cracks are found, do not attempt to repair, contact Chance Rides Customer Service Department immediately for replacement parts. Do not operate ride until the Chance Rides, Inc. approved repair has been complete.

All work must be performed by qualified personnel, capable of understanding the function of the parts and their proper installation.

NOTICE

Use only those components authorized, specified or provided by Chance Rides, Inc.

Chance Rides, Inc. SPECIFICALLY DISCLAIMS ANY LIABILITY for losses associated with any unauthorized alterations and/or modifications or additions and installations of unauthorized components.





Number: B392R1042-A

Date: July 28, 1989

Supersedes: B392R1042-0

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

86-5308 and 392-00986 through 392-01989

Ride: THUN

THUNDERBOLT

Subject: Hydraulic Motor Mount Rework



WARNING: FAILURE TO COMPLY WITH THIS SERVICE BULLETIN CAN RESULT IN FAILURE OF THE DRIVE MOTOR, CAUSING THE RIDE TO STOP ABRUPTLY. THIS CAN RESULT IN INJURY TO PASSENGERS.

This bulletin supersedes Service Bulletin No. B392R1042-0. It is no longer in effect and should be destroyed.

It has been determined by CHANCE RIDES, INC. that the hydraulic drive motor shaft can fail during operation. The motor mount and pinion gear have been redesigned to reduce the load on the motor shaft.

All owners of the above noted THUNDERBOLT amusement rides are required to perform the rework described in this bulletin by January 1, 1990.

Perform the rework using the instructions on the following pages of this bulletin. Order Kit No. K392R1042-0 and install the kit using the instructions provided. All work must be performed by qualified personnel, capable of understanding the function of the parts and their proper installation.

Return the attached Certification Of Compliance no later than January 1, 1990. If there are any questions regarding the instructions or this rework, contact the CHANCE CUSTOMER SERVICE DEPARTMENT.

PARTS LIST - Kit No. K392R1042-0,

The following parts are included to rework one ride. Ref. Qty. No. Part Number Description Reqd. 1. 34510300 *MOUNT ASSEMBLY (392-618-001) 1 2. 34517006 MOTOR MOUNT (392-615-001) . . 3. 34517007 MOUNT PLATE (392-616-001) 1 4. 34946300 PAD (392-621-003) 5. 1 64806900 6. NUT - Pinion (1-1/2 - 12 Flexlock) 7. 33476502 HOSE - Hydraulic (392-650-001) 8. 33476503 HOSE - Hydraulic (392-650-002) 2 9. CAPSCREW - Grade 5 ($5/8-11 \times 1-3/4$). 60910600 8 WASHER - Hardened (5/8) 10. 68552900

* For replacement parts for the motor mount assembly, refer to drawing on page 12 of this bulletin.

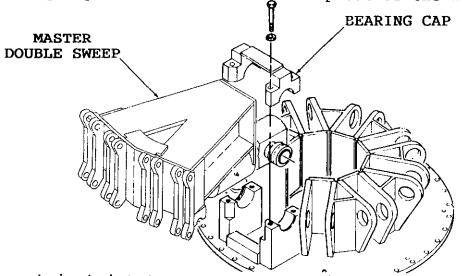


WARNING: The hydraulic motor and its mounting components are extremely heavy. To prevent personal injury, never attempt to remove or install any parts without a jack and blocking to adequately support the parts as they are lowered or raised.

REWORK INSTRUCTIONS

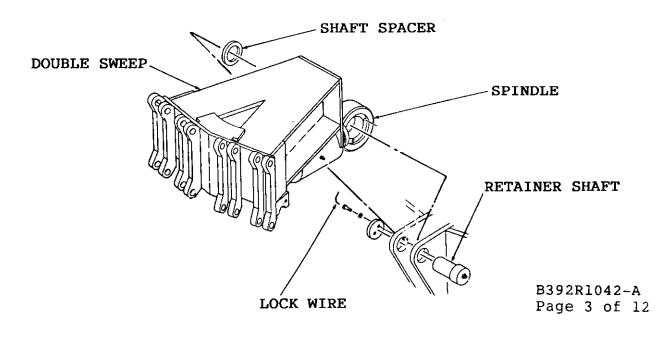
NOTE: This rework requires partial disassembly of the ride. Use the normal tear-down or set up procedures given in the CHANCE OPERATION & MAINTENANCE MANUAL when a partially disassembled ride configuration is required.

- Remove all cars and spreader bars from the ride. Use the chain hoist to remove all sweeps from the double sweeps.
- 2. Use the chain hoist to support the master double sweep and remove the bearing caps. Move the double sweep out of the way.

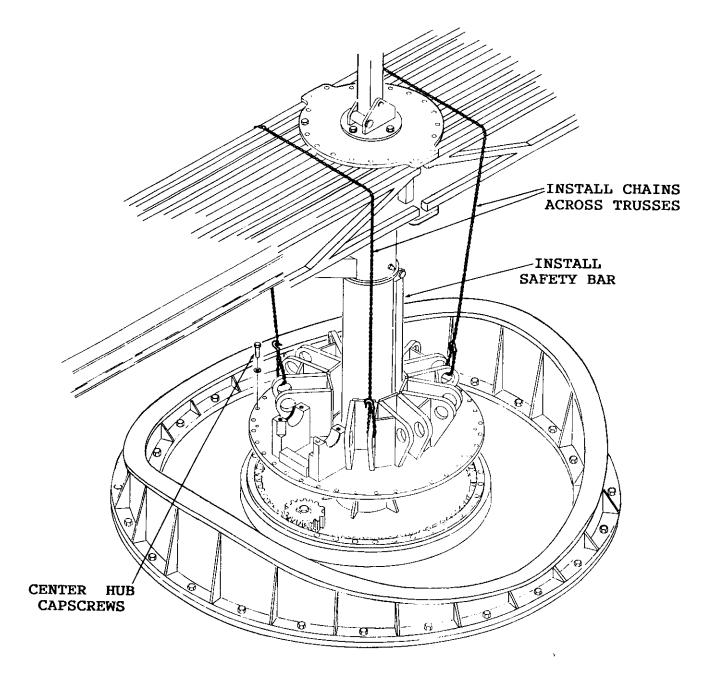


3. Use the chain hoist to remove the remaining double sweeps. Remove the sweep spindle retainer shafts and move the double sweeps out of the way.

IMPORTANT: Keep each retainer shaft with the sweep spindle from which it is removed. The double sweeps should be marked so that they are installed in their original positions.

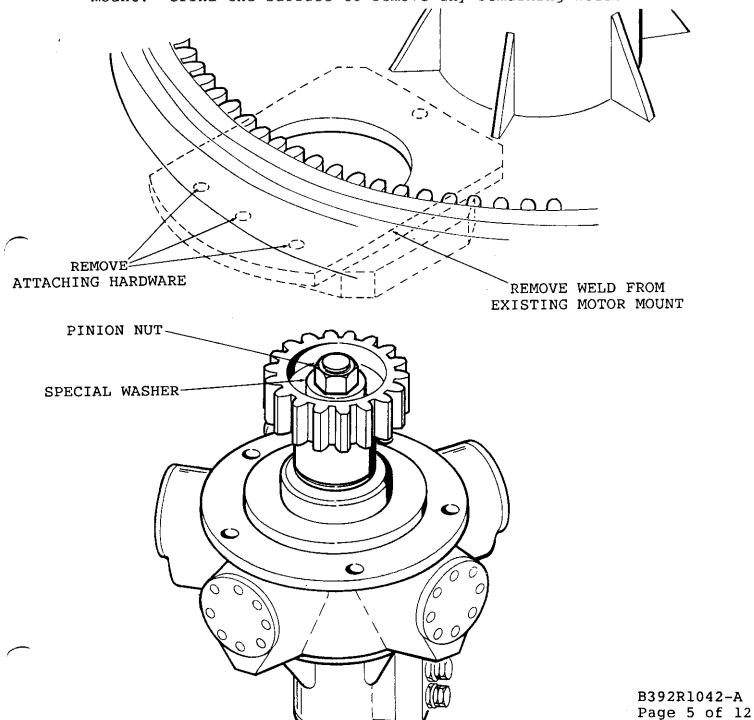


- 4. Remove the capscrews from the center hub.
- 5. With the center truss pole retracted, install chains across the trusses and attach to the center hub in four places as shown. Carefully raise the center pole, lifting the center hub. Install the safety bar.

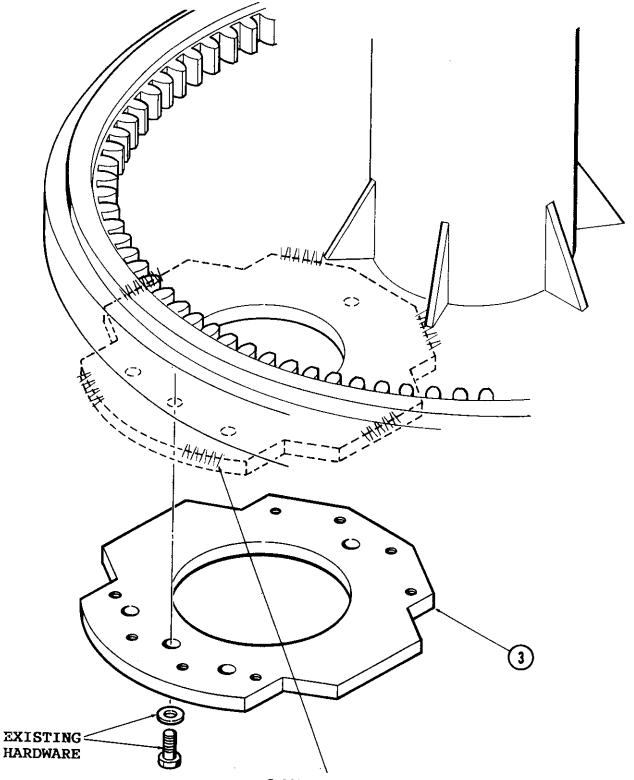


6. Remove the plumbing from the hydraulic motor. Make note of which ports are connected by each hydraulic line. These lines will be replaced with new hoses.

- 7. Using a hydraulic jack and blocking under the hydraulic motor, remove the five capscrews which mount the motor. Lower and remove the motor.
- 8. Remove the pinion nut and special washer from the motor shaft. Use a suitable puller to remove the pinion gear from the motor shaft. Return the pinion gear to the factory. Discard the nut, but save the special washer and the key.
- 9. Use an air/arc to remove the weld between the existing motor mount and the hub. Remove the attaching hardware and remove the motor mount. Grind the surface to remove any remaining weld.



10. Install the new mount plate (Item #3) with the existing hardware, but do not tighten at this time.

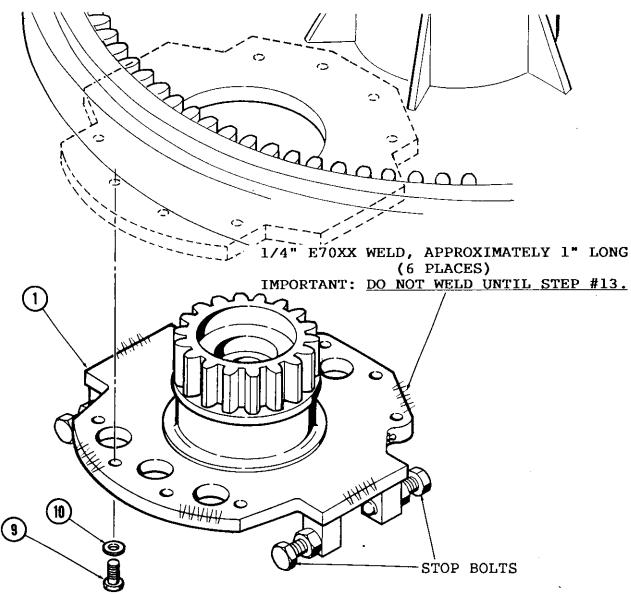


1/4" E70XX WELD, APPROXIMATELY 2" LONG
(6 PLACES)

IMPORTANT: DO NOT WELD UNTIL STEP #13.

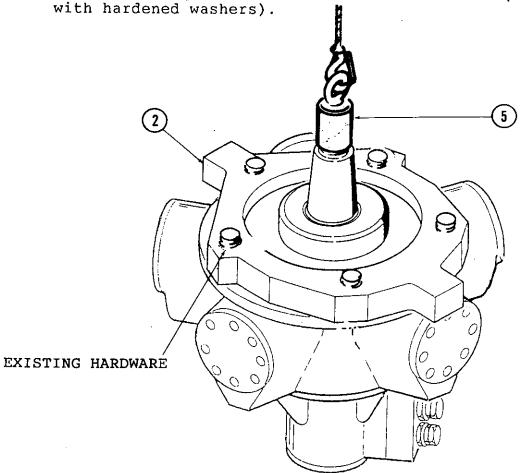
11. Install the mount assembly (Item #1 to the mount plate using the capscrews and hardened washers (Items #9 and #10). Tighten the capscrews to 105 ft-1bs. (5/8-11 Grade 5 capscrews).

IMPORTANT: Loosen the jam nuts and turn all four stop bolts out until their spherical ends do not protrude.



- 12. Adjust the mesh of the pinion gear to the ring gear by moving the mount plate as required to obtain 0.005 inch of between the teeth.
- 13. When the correct adjustment is obtained, tighten the four bolts to 145 ft-lbs. (5/8-11 Grade 8 bolts with hardened washer). Weld the mount plate to the frame as shown in the illustration on page 6. Weld the housing of the mount assembly to the mount plate as shown in the illustration on this page.

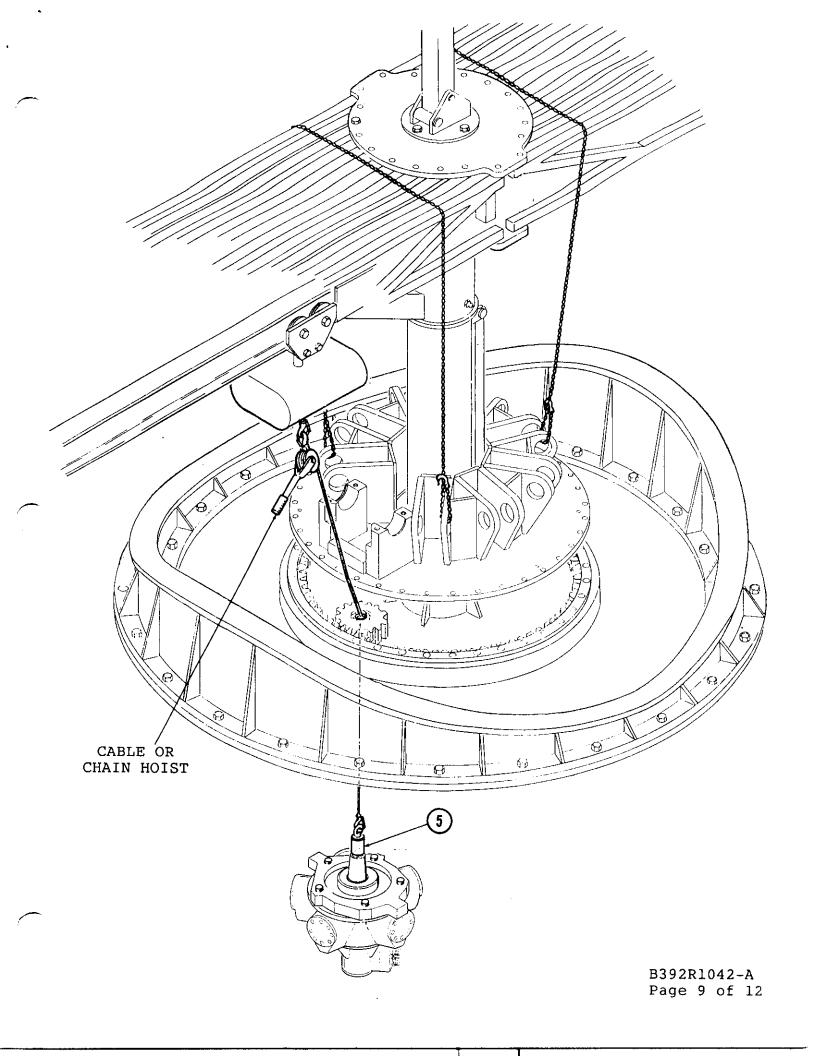
14. Install the motor mount (Item #2) on the motor using the existing hardware. Tighten the bolts to 185 ft-lbs. (3/4-10 Grade 5 bolts with hardened washers)



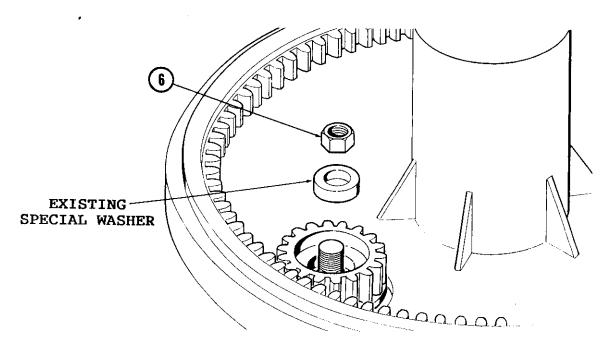
- 15. Install the existing key in the motor shaft keyway.
- 16. Install the lifting adapter (Item #5) on the hydraulic motor shaft. Attach a suitable cable or chain hoist to the lifting adapter, through the center of the pinion gear as shown on the following page.
- 17. Using the hoist in conjunction with the hydraulic jack, raise the motor into position. Make sure the key lines up with the keyway in the pinion.

NOTE: Do not attempt to raise the motor completely into position with the hoist. Raise it high enough that the lifting adapter can be removed and the special washer and pinion nut can be installed.

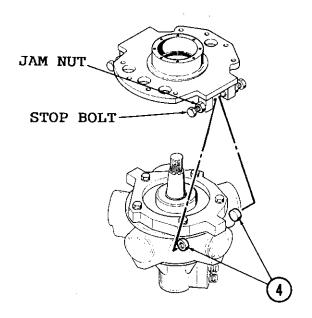
18. Make sure the motor is securely blocked from underneath and remove the lifting adapter.



19. Install the existing special washer and new pinion nut (Item #6)



20. Tighten the nut to 700 ft-lbs. As the nut is tightened, the motor will be drawn up into position.



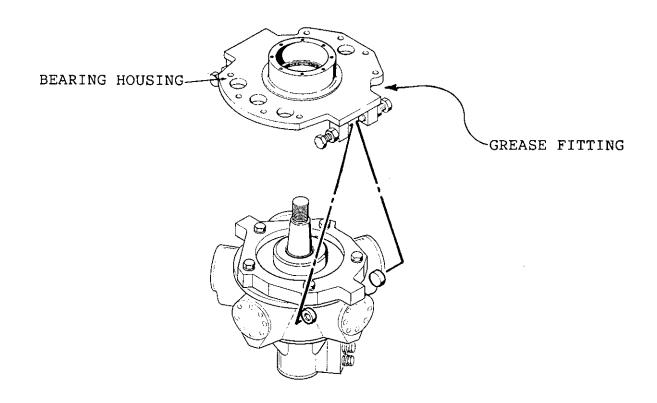
21. Tighten the four stop bolts evenly, with a pad (Item #4) installed over the spherical end of each stop bolt. Tighten the stop bolts until snug, then tighten the jam nuts.

- 22. Install the hydraulic hoses (Items #7 and #8).
- 23. Lower the center hub into position. Install the capscrews and washers and tighten to 105 ft-lbs. (5/8-11 Grade 8 capscrews with hardened washers).
- 24. Install all double sweeps except the master double sweep. Install the retainer shafts and tighten the capscrews to 105 ft-lbs. Install new lockwire in the capscrews.

NOTE: Install the shaft spacer on the side of the sweep spindle opposite the large end of the retainer shaft.

- 25. Install the master double sweep. Install the bearing caps, hardened washers and capscrews. Tighten the capscrews to 460 ft-lbs. (7/8-9 Grade 8 capscrews with hardened washers).
- 26. Install all sweeps on the double sweeps. Install and adjust the spreader bars as instructed in Service Bulletin B392R1004-A.
- 27. Complete the ride set-up procedure as described in the CHANCE OPERATION & MAINTENANCE MANUAL.

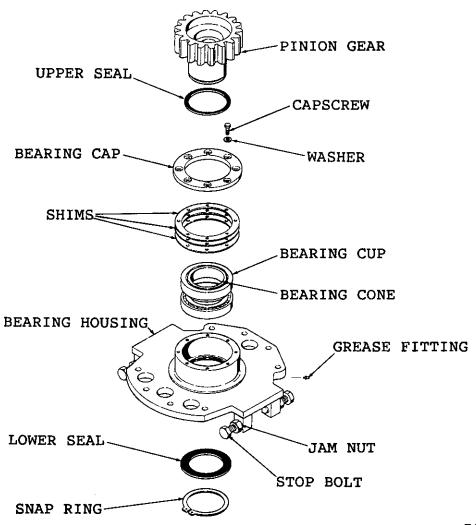
IMPORTANT: Thoroughly lubricate the bearings in the mount assembly through the grease fitting provided using No. 2 lithium base grease. The bearings must be lubricated at weekly intervals.



REPLACEMENT PARTS

The 34510300 MOUNT ASSEMBLY (392-618-001) consists of the following parts

35242600	PINION GEAR (392-624-001)	1
33493400	BEARING HOUSING (392-609-001)	1
30742200	STOP BOLT (392-621-004)	2
36451700	SEAL - Upper (392-621-005)	1
36451600	SEAL - Lower (392-621-002)	
31220200	BEARING CAP (392-621-001)	_
71395300	SHIM - 0.003 (392-623-001)	
71395400	G11714 0 000 (000 000 000)	/R
71395500	SHIM - 0.015 (392-623-003) A	/R
290-0518001	BEARING CUP	2
290-0446701	BEARING CONE	2
290-6129801	SNAP RING - External (4-1/4")	1
697-8981200	GREASE FITTING - 45° (1/4-28)	1
691-4762800	JAM NUT (7/8-9)	4
686-0786200	CAPSCREW - Hex Head $(3/8-16 \times 1)$	8
696-8553100	WASHER - Hardened (3/8)	8
	, , , , , , , , , , , , , , , , , , , ,	_



B392R1042-A Page 12 of 12



Number: B392R1004-A

Date: Dec. 31, 1988

Supersedes: A392R1004-0

(6-30-86)

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

All Units Which Have Been Reworked To Comply

Effective Serial Numbers: With Service Bulletin B392R1027-0.

Ride: THUNDERBOLT

Subject:

Installation, Inspection And Adjustment Of Spreader Bars

Safety Alert Bulletin Number A392R1004-0 is superseded by this Service Bulletin. It is no longer in effect and should be destroyed.

CHANCE RIDES, INC. wishes to emphasize the importance of the spreader bars on THUNDERBOLT amusement rides. Worn, damaged or improperly adjusted spreader bars can cause damage to the sweeps, spreader bars and center hub, and cause rough operation, which can result in injury to passengers.

READ THESE INSTRUCTIONS THOROUGHLY AND BECOME FAMILIAR WITH THE ENTIRE PROCEDURE. All work must be performed by competent, qualified mechanics, capable of understanding the function of the parts and their proper installation.

Complete the spreader bar inspection, installation and adjustment procedure using the instructions on the following pages of this bulletin. If you have any questions regarding the instructions or this procedure, contact the CHANCE CUSTOMER SERVICE DEPARTMENT.

INSPECTION OF SPREADER BARS AND ATTACHING EARS

Before adjusting the spreader bars, inspect all spreader bars and their attaching ears for cracks or bends. Inspect the spreader bar rod ends and the bushings in the attaching ears for wear or damage, and replace if necessary. Check the condition of all pins and hairpins.

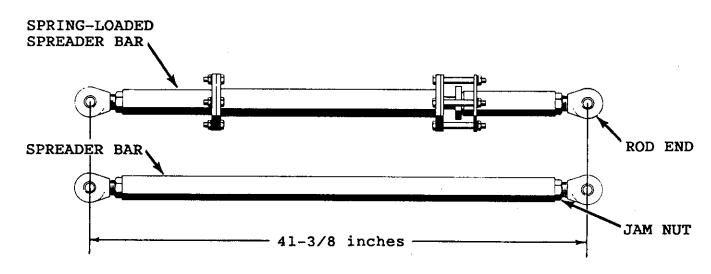
DO NOT OPERATE THE RIDE WITH QUESTIONABLE SPREADER BARS.

IMPORTANT: Do not attempt to repair spreader bars in the field.

Any spreader bar which has been welded, drilled, or otherwise repaired must be discarded and replaced with a new part.

SPREADER BAR INSTALLATION AND ADJUSTMENT PROCEDURE

1. With all spreader bars removed from the ride, including the spring loaded spreader bar, loosen all jam nuts (two on each spreader bar).

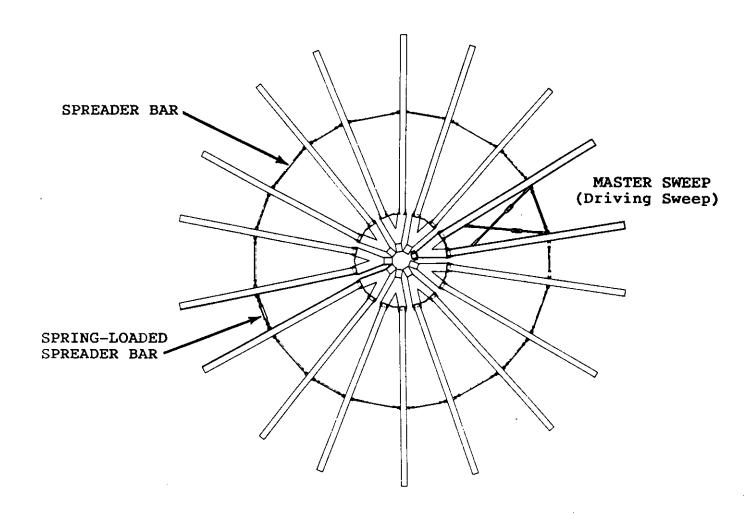


2. Measure the length between the rod ends, center-to-center, on all spreader bars, including the spring-loaded spreader bar. This measurement must be 41-3/8 inches. Adjust the rod ends, but do not tighten the jam nuts at this point. THIS LENGTH IS USED AS A "BASE-LINE" MEASUREMENT ONLY, AND MUST BE ADJUSTED AS REQUIRED IN THE FOLLOWING STEPS.

IMPORTANT: Both rod ends must be threaded into the spreader bars an equal number of turns. Always adjust both rod ends equally, within one-half turn.

3. Install the spreader bars on the ride, using the correct pins and hairpins.

NOTE: The spring-loaded spreader bar must be installed 180° from the master sweep (driving sweep).

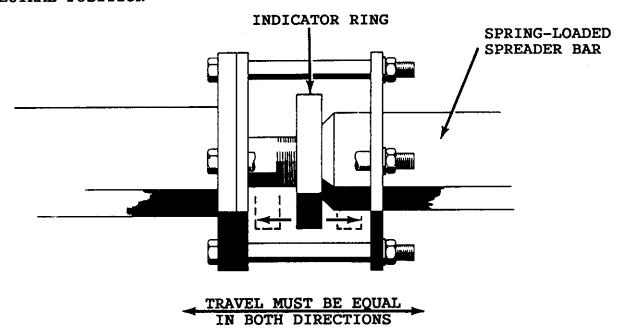


- 4. The vehicles must be installed to properly adjust the spreader bars. If the vehicles are not on the ride, install them at this time.
- 5. Rotate the ride counter-clockwise at least one complete revolution by hand, using two or three men.

NOTE: Open the hand valve on the hydraulic motor for ease of turning.

As the ride turns, watch the indicator ring on the spring-loaded spreader bar, as the spreader bar extends and retracts. The indicator ring must travel the same distance from "neutral" in both directions.

NEUTRAL POSITION



6. If the travel is equal in both directions, tighten the jam nuts on all spreader bars.

If the travel is not equal in both directions, adjust the length of each spreader bar (either longer or shorter) by turning the rod ends. ALL SPREADER BARS, INCLUDING THE SPRING-LOADED SPREADER BAR, MUST BE THE SAME LENGTH. If one spreader bar is adjusted to a longer length, ALL spreader bars must be lengthened by the same amount.

Repeat Steps 5 and 6 until the travel is equal.

- 7. As a final check, get into the vehicle closest to the spring-loaded spreader bar. Observe the action of the spring-loaded spreader bar during normal ride operation, at both low and high speeds. If the indicator ring travel is equal in both directions, the adjustment is satisfactory.
- 8. Permanently mark all sweeps so that they can be installed in the same location every time the ride is set up.
- 9. Check the spreader bar adjustment monthly, or at every set-up, using the observation procedure in Step 7.



Number: B392R1023-0

Date: Nov. 28, 1988

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers: All Units

Ride: THUNDERBOLT

Subject:

Operation Of Shut-Off Valves For Hydraulic

Leveling Jacks

As a safety precaution, CHANCE RIDES, INC. requires that the owners of all THUNDERBOLT amusement rides instruct their employees to follow the correct procedure for operation of the shut-off valves for the hydraulic leveling jacks. Safety decals are enclosed with this bulletin to remind employees of these instructions.

Install the five decals (part no 276-2203200), one on each leveling jack and one near the shut-off valves. After the decals have been installed, always follow the recommended operating procedures.

A WARNING

RETRACT THE HYDRAULIC LEVELING JACKS AND CLOSE SHUT-OFF VALVES FOR THE JACKS DURING NORMAL RIDE OPERATION.

If the valves are left open, hydraulic pressure from the drive system, or pressure from hydraulic oil expanding due to heat can cause one or more of the jacks to extend, making the ride unstable. Injuries to passengers and/or bystanders can result.

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Number:

B392R1020-0

Date:

March 21, 1988

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

392-008-86 through 392-014-87

Ride: THUN

THUNDERBOLT

Subject:

Master Sweep Bearing Cap Rework (Capscrews)

As a safety precaution, CHANCE RIDES, INC. requires that the owners of THUNDERBOLT amusement rides with the above noted serial numbers perform the modification described in this bulletin. This modification will provide improved retention of the master sweep bearings in the center hub.

Order kit number K76-0317-00, which includes all necessary parts and hardware for one complete ride. Install the kit using the instructions provided on the following pages of this bulletin. Fill out the attached Certification Of Compliance for the installation within 15 days of receipt of the kit.

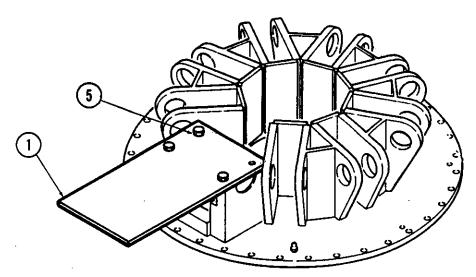
PARTS LIST

Kit Number K76-0317-00 Master Sweep Bearing Cap Rework

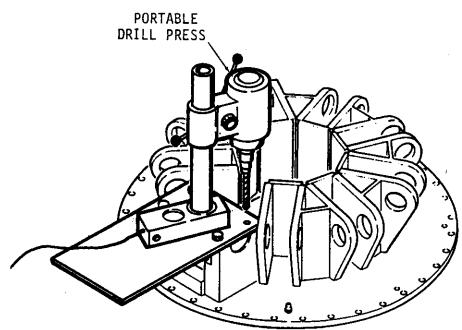
Item No.	Ouantity	Part Number	Description
1	1	376-31703	Drill Guide (K76-0317-01)
2	4	686-09831	Capscrew - 7/8-9 x 4-1/2" (Grade 8)
3	4	376-85568	Hardened Washer - Special (K76-0317-02)
4	1		Tap (7/8-9 Thread)
5	3	686-09512	Bolt - 3/4-10 x 1-1/2"
6	3	686-10226	Bolt - 7/8-9 x 1-1/2"
7	1		Drill Bit (49/64" Diameter)
8	1		Drill Bit (29/32" Diameter)

INSTALLATION INSTRUCTIONS

- 1. Use the chain hoist to remove the two sweeps from the master sweep.
- 2. Using the hoist to support the weight of the master sweep, remove the four 3/4-10 bolts from the bearing caps. Remove the cap and move the master sweep out of the way.

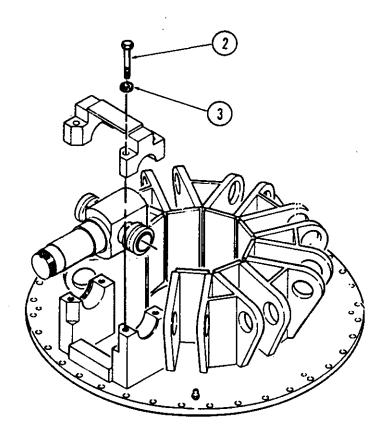


3. Use three $3/4-10 \times 1-1/2$ bolts (Item #5) to mount the drill guide (Item #1) to the bearing blocks on the center hub as shown.



4. Using a 1-1/4" capacity portable drill press with a magnetic base, locate the drill exactly over the existing threaded hole. Drill the hole to 49/64" diameter, 3" deep, using the bit provided (Item #7). DO NOT USE A HAND-HELD DRILL MOTOR.

- 5. Tap the hole to 7/8-9, 2-1/2" deep using the tap provided (Item #4). Install a $7/8-9 \times 1-1/2$ " bolt.(Item #6).
- 6. Remove the next 3/4-10 bolt and repeat Steps 4 and 5 on that hole.
- 7. Repeat Steps 4, 5 and 6 until all four holes have been drilled and tapped to 7/8-9.
- 8. Remove the capscrews and the drilling guide.
- 9. Drill the four holes in the bearing cap to 29/32" diameter, using a drill press and the drill bit provided (Item #8). DO NOT USE A HAND HELD DRILL MOTOR.



- 10. Install the master sweep and bearing cap using the 7/8-9 capscrews (Item #2) with the special hardened flatwashers (Item #3) under the heads. Tighten the capscrew to 460 ft-lbs. torque.
- 11. Reassemble the sweeps to the master sweep.
- 12. Check the torque of the capscrews at weekly intervals or at every set-up, whichever occurs first.



Number: B392R1016-0

Date: September 9, 1987

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers: 392-008-86 through 392-010-86

Ride: THUNDERBOLT

Subject: Vehicle Frame

Pivot Modification

As a safety precaution, CHANCE RIDES, INC. requires that the owners of THUNDERBOLT amusement rides with the above noted serial numbers perform the modification described in this bulletin. This modification will provide improved bearing retention in the vehicle frame pivot.

Order kit number K76-0306-00, which includes all necessary parts and hardware for one complete ride. Install the kit using the instructions provided on the reverse side of this bulletin. Fill out the attached Certification Of Compliance for the installation no later than January 1, 1988.

PARTS LIST

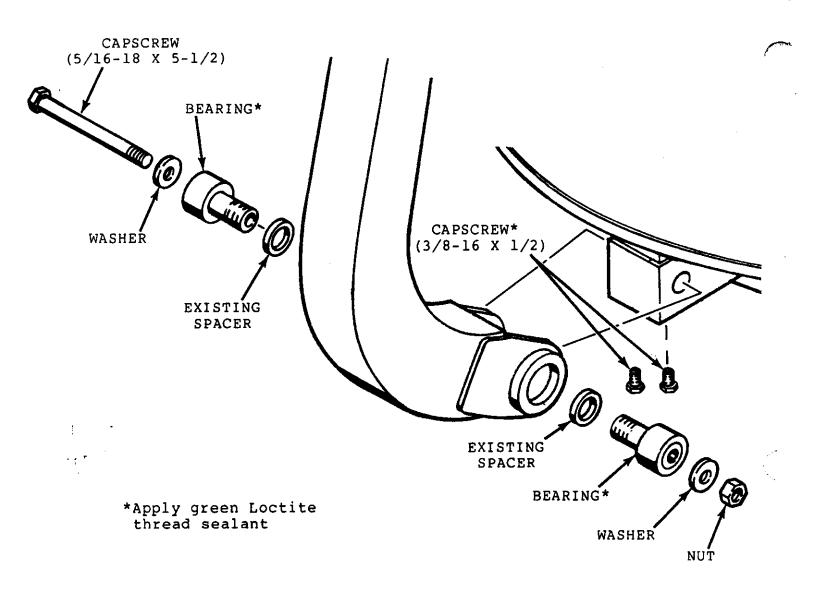
Kit Number K76-0306-00 Vehicle Frame Pivot Modification

Quantity	Part Number	Description
36	376- 0 4416	BEARING (392-136-001)
18	686-07531	CAPSCREW - Gr.8 $(5/16-18 \times 5-1/2)$
18	691-48044	NUT - Lock (5/16-18)
36	696-85306	WASHER (5/16)
36	686-07662	CAPSCREW $(3/8-16 \times 1/2)$

INSTALLATION INSTRUCTIONS

All work must be performed by a competent, qualified mechancics, capable of understanding the function of the parts and their proper installation. Read these instructions thoroughly and make sure you understand them before installing the kit.

- 1. Remove all four set screws from the vehicle frame pivot.
- 2. Unscrew and discard the bearing on one side of the vehicle. Be sure to keep the spacer. Install the new bearing and existing spacer in the frame using green Loctite thread sealant, and tighten the bearing. Repeat the procedure on the other side of the vehicle.
- 3. Install the $5/16-18 \times 5-1/2$ capscrew, washers and nut through the new bearings as shown. Tighten the nut to 15-18 lb-ft.
- 4. Install $3/8-36 \times 1/2$ capscrews in the two set screw holes using green Loctite thread sealant, to prevent grease from escaping.
- 5. Use a grease gun to liberally lubricate the new bearings.
- 6. Repeat Steps 1 through 5 on the remaining vehicles.





Number: B39

B392R1015-0

Date:

June 30, 1987

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers:

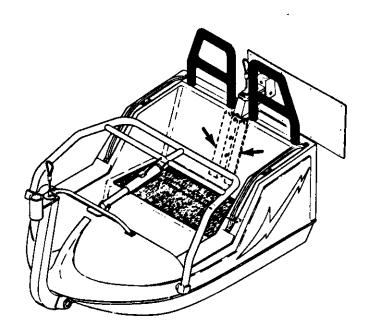
392-008-86 through 392-010-86

Ride: THUNDERBOLT

Subject: Vehicle Back Brace

A kit is now available to provide additional support in the back rest area of the vehicles on THUNDERBOLT amusement rides with the above noted serial numbers. CHANCE RIDES, INC. recommends that this kit be installed to extend the service life of the vehicle fiberglass.

Order kit number K76-0304-00, which includes all necessary parts and hardware for one complete ride. Install the kit using the instructions provided on the reverse side of this bulletin.

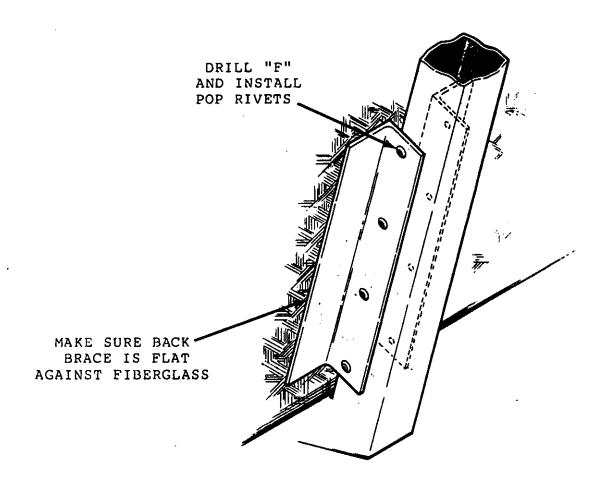


PARTS LIST

Kit Quantity	Number K76-0304-00 Part Number	Vehicle Back Brace Description
36	376-09094	BACK BRACE (392-111-001)
144	684-61451	POP RIVET - SC86BS

INSTALLATION INSTRUCTIONS

All work must be performed by a competent, qualified mechancics, capable of understanding the function of the parts and their proper installation. Read these instructions thoroughly and make sure you understand them before installing the kit.



- 1. Remove the back panel from the vehicle.
- 2. Place the back brace on the vehicle frame fo that it is flat against the fiberglass in the back rest area.
- 3. Locate and drill holes (Size "F") and install the back brace with poprivets.
- 4. Use the same procedure to install the back brace on the opposite side of the vehicle frame
- Install the back panel.
- 6. Repeat Steps 1 through 5 on the remaining vehicles.



Number: B392R1010-0

Date: June 30, 1987

Supersedes:

America's Largest Manufacturer of Amusement Rides

SERVICE BULLETIN

Effective Serial Numbers: 392-008-86 through 392-014-86

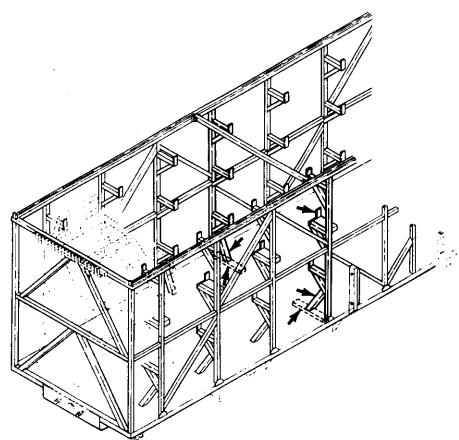
Ride: THUNDERBOLT

Subject:

Auxilliary Trailer

Rack Rework

CHANCE RIDES, INC. recommends that the following rework be performed on THUNDERBOLT amusement rides with the above noted serial numbers. The rework reinforces the vertical members of the vehicle racks for added rigidity.



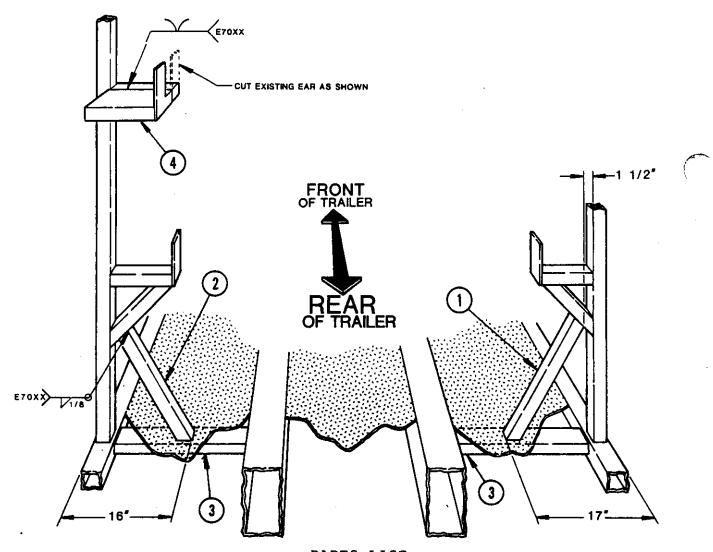
Order kit number K76-0300-00, which includes all parts necessary for one complete ride. Install the kit using the instructions provided on the reverse side of this bulletin.

INSTALLATION INSTRUCTIONS

All work must be performed by a certified welder, capable of understanding the function of the parts and their proper installation.

Read these instructions thoroughly and make sure you understand them before installing the kit. Identify all parts by checking them against the parts list. If any parts are missing, notify the CHANCE CUSTOMER SERVICE DEPARTMENT.

- 1. Locate and weld the floor braces (Item #3) as shown.
- 2. Locate and weld the angle braces (Items #1 and #2) as shown. Pay particular attention to the diffferent length angle braces for each side of the trailer.
- 3. Cut the ears flush with the tubes on the existing vehicle hangers as shown. DO THIS ONLY ON THE MIDDLE ROW OF HANGERS ON THE ROADSIDE WALL OF THE TRAILER.
- 4. Locate and weld the offset vehicle hangers (Item #4).



PARTS LIST

Kit Number K76-0300-00 Auxilliary Trailer Rack Rework

No.	Quantity	Part Number	Description
1 2	6	376-09214 376-09215	ANGLE BRACE - 25-3/16 Lg. (392-517-048) ANGLE BRACE - 19-5/8 Lg. (392-517-049)
3 4	12 6	376-09216 376-32750	FLOOR BRACE (392-516-037) OFFSET VEHICLE HANGER (K76-0300-01)



THE WORLD'S RIDE



March 1, 2001

Isadore Rommes
Bureau of Fair Rides Inspection
3125 Conner Boulevard
Tallahassee, FL 32399

Isadore;

This letter is in response to your letter dated November 16, 2000 addressed to Mike Williams of Farrow Amusements. In your letter to Mr. Williams, you requested a letter from Chance Rides, Inc. regarding the possible cause of failure of 18 center hub to bearing bolts on an amusement ride serial number 392-03095.

The area in question was first identified as a special care area in 1973 after it was reported that some of the bolts had worked loose. At that time, bulletin number 61 was issued. Since then, bulletin number 61 has been updated and superceeded several times. For the ride in question, information as to this special care area can be found in the ride manual on page 4-11. Per the information published in the manual, the torque on the center hub to bearing bolts must be checked once a week or at each set-up, whichever occurs first. Failure to maintain the proper torque or the use of the wrong hardware can result in failure of the bolts.

The center section of this ride has been brought back to Chance Rides, Inc. for repair. We replaced the bearing, applying new epoxy to make a flat surface, and replaced all of the center hub to bearing bolts. It is our opinion that from a maintenance standpoint, the center section is per our specifications and safe for operation.

If you have any further questions regarding this information, please feel free to contact me.

Sincerely,

Steven Laycock

Q.A./Product Safety Manager

Cc: Mike Williams

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