

# INVERTER

## Field inspection and test guide

 [Click Here To Return To Main Table of Contents](#)

### Contents

|   |           |
|---|-----------|
| <b>Introduction</b> .....                                       | <b>2</b>  |
| Manufacturer's specifications .....                             | 2         |
| Ride description .....  | 3         |
| <b>Operation</b> .....  | <b>4</b>  |
| Operating controls .....  | 4         |
| Operating the ride (test cycle) .....                           | 8         |
| <b>General inspection and testing</b> .....                     | <b>9</b>  |
| Testing .....   | 9         |
| Field performance testing of amusement rides .....              | 9         |
| Non-destructive testing .....                                   | 11        |
| Fasteners .....   | 12        |
| Capscrews .....   | 12        |
| Pins .....  | 16        |
| Inspection .....  | 18        |
| Joint inspection .....  | 18        |
| Cable inspection .....  | 19        |
| <b>Leveling and blocking</b> .....                              | <b>21</b> |
| <b>General safety guidelines</b> .....                          | <b>23</b> |
| <b>Vehicle inspection</b> .....                                 | <b>24</b> |
| <b>Passenger restraint and interlock system</b>                 |           |
| operational check .....   | 26        |
| <b>Tower, hub, sweep and counterweight arm inspection</b> ..... | <b>28</b> |
| <b>Electrical and lighting inspection</b> .....                 | <b>29</b> |
| <b>Trailer or park base inspection</b> .....                    | <b>30</b> |
| <b>Platform and fence inspection</b> .....                      | <b>30</b> |
| <b>Hydraulic system inspection</b> .....                        | <b>31</b> |
| <b>Air system inspection</b> .....                              | <b>31</b> |
| <b>NDT inspection schedule</b> .....                            | <b>32</b> |
| <b>Bibliography</b> .....                                       | <b>33</b> |

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## Introduction

Proper maintenance is essential to the safe operation of this ride. The inspection points outlined in this field inspection 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 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 guide applies only to products manufactured by CHANCE RIDES INC. built after January 1, 1986.

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 Specifications<sup>5</sup>

Reference Standard:

ASTM - 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 portable model **Inverter** is mounted on a single trailer. The ride is equipped with a DC electric drive, with a pneumatic parking brake. An on-board hydraulic system provides power for erection of the portable model.

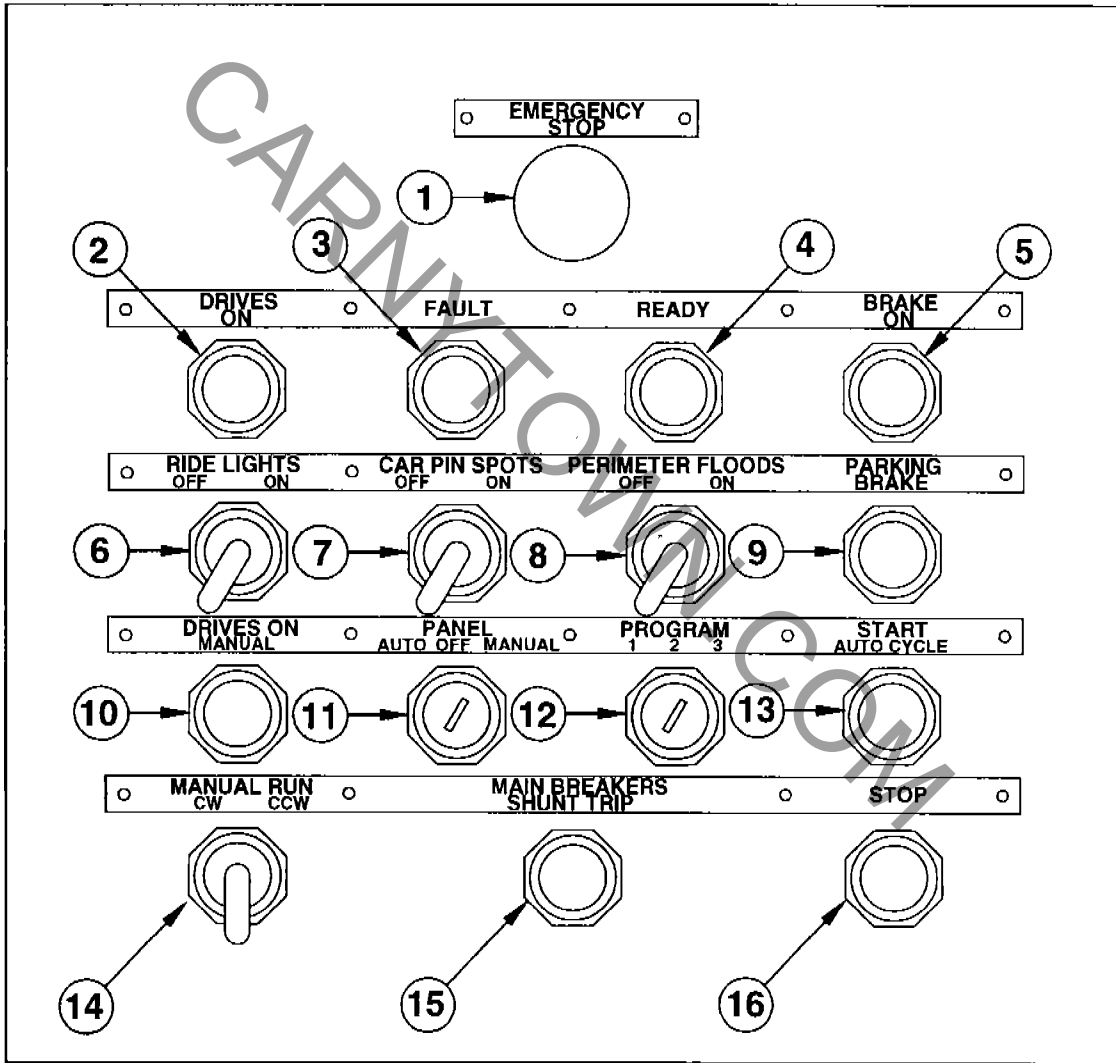
The ride information plaque is mounted to the main electrical cabinet at the rear of the ride. It lists specifications, operating dimensions, ground loads, as well as model and serial number and date of manufacture.

Detailed operation and maintenance information is available in the *Inverter Service Manual* (manual number 24200000).

For more information, or to order manuals, contact CHANCERIDES, INC.



# Operation



**IMPORTANT:** *The CONTROL POWER AND LIGHTING CIRCUIT BREAKER and the DRIVES, BLOWERS & HYDRAULIC MOTOR CIRCUIT BREAKER on the main electrical box must be on before operating any of the controls on the operator's console.*

1. **Emergency Stop Button** - This palm switch overrides the drive program to bring the vehicle to a stop at the loading/unloading position quickly.
2. **Drives On Light** - This green light illuminates when the DRIVES, BLOWERS & HYDRAULIC MOTOR CIRCUIT BREAKER is in the "On" position and the drives are operating in the "AUTO" mode. In the "MANUAL" mode, the light will illuminate when the DRIVES, BLOWERS & HYDRAULIC MOTORS CIRCUIT BREAKER is in the "On" position and the DRIVES ON MANUAL SWITCH is pressed.
3. **Fault Indicator Light** - This red light is normally off. It will flash if the drive circuit breaker trips. The light will illuminate and stay on if any lighting circuit breaker trips.
4. **Ready Light** - This green light illuminates when all primary and secondary lap bars are in the down and locked position, the step is raised, the drives are on and the OPERATOR PRESENCE SWITCH is depressed. A flashing green light indicates a tripped circuit breaker.
5. **Brake On Light** - This red light illuminates when the brakes are applied in either the "Auto" or "Manual" mode.
6. **Ride Lights Switch** - Use this switch to turn on the decorative lighting on the sweep and the vehicle. If the FAULT INDICATOR LIGHT comes on after this switch is pushed, a tripped circuit breaker in the ride lighting circuit is indicated.
7. **Car Pin Spots Switch** - Use this switch to turn on the decorative lights on the vehicle. If the FAULT INDICATOR LIGHT comes on after this switch is pushed, a tripped circuit breaker in the car pin spot light circuit is indicated.



8. **Perimeter Floods Switch** - Use this switch to turn on the floodlights around the perimeter of the ride. If the FAULT INDICATOR LIGHT comes on after this switch is pushed, a tripped circuit breaker in the perimeter flood light circuit is indicated.
9. **Parking Brake Switch** - Use this switch to release the parking brake. The BRAKE ON LIGHT illuminates when the parking brake is engaged manually or by the ride program.
10. **Drives On Manual Switch** - Use this switch to turn on the drives when the PANEL MODE Switch is in the "Manual" position.
11. **Panel Mode Switch** - Use this key-operated switch to select either automatic (programmed) operation or manual operation with the MANUAL RUN SWITCH.

**NOTE:** This switch is keyed the same as the PROGRAM SWITCH

12. **Program Switch** - Use this key-operated switch to select any of the three programmed ride cycles.

**NOTE:** This switch is keyed the same as the PANEL MODE SWITCH.

13. **Start Auto Cycle Switch** - Use this switch to start the programmed ride cycle. The following conditions must exist for the ride to operate:
  - The AUTO/MANUAL MODE SWITCH must be in the "Auto" position
  - The OPERATOR PRESENCE SWITCH must be engaged.
14. **Manual Run Control** - Use this lever when the PANEL MODE SWITCH is in the "Manual" POSITION. The following conditions must exist for the ride to operate:
  - The PANEL MODE SWITCH must be in the "Manual" position
  - The OPERATOR PRESENCE SWITCH must be engaged.
15. **Main Breakers Shunt Trip Switch** - Use this red button to turn off the CONTROL POWER & LIGHTING CIRCUIT BREAKER and the DRIVES, BLOWERS & HYDRAULIC MOTOR CIRCUIT BREAKER on the main electrical box.



16. **Stop Button** - This red button interrupts the drive program. The vehicle will come to a normal, programmed stop at the loading/unloading station.
17. **Operator Presence Switch (not shown)** - This foot-operated switch is located below the control panel. The switch must be engaged to operate the START or DRIVE switches. If the switch is released, the drive program is interrupted and the vehicle will come to a normal, programmed stop at the loading/unloading station. The switch must be released and re-engaged after each ride cycle.

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**Operating the ride (test cycle)**

The operating procedure is provided on a decal, mounted in the cover of the operator's control console. Make sure the decal is legible. Test the operation of all controls. Throughout the ride cycle, check for correct speed and proper operation of all limit switches.

Check the overall performance of the ride based on previous operating performances of the individual ride.

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## General inspection and testing

### Testing

#### Field performance testing of amusement rides<sup>1</sup>

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, or 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).

<sup>1</sup> B090R1002-0 May 14, 1986



**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.

CHANCERIDES, 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 testing<sup>2</sup>

- 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, 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
- 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% rated yield and group joint efficiencies of 62.5%

### Torque requirements<sup>4</sup>

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 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.



| SIZE (DIAMETER) -<br>Threads per Inch   | Foot-Pound Torque Range<br>(see Notes 1 and 2)<br>with Locknut and Hardened Washer |                                  |
|---|--|----------------------------------|
|   | SAE J429<br>Grade 5<br>ASTM A325   | SAE J429<br>Grade 8<br>ASTM A490 |
| 1/4 - 20<br>1/4 - 28  | 5-6<br>6-7   | 7-8<br>8-10                      |
| 5/16 - 18<br>5/16 - 24  | 11-13<br>12-15   | 15-18<br>17-21                   |
| 3/8 - 16<br>3/8 - 24  | 19-24<br>22-27   | 27-33<br>31-38                   |
| 7/16 - 14<br>7/16 - 20  | 30-35<br>35-40   | 45-55<br>50-60                   |
| 1/2 - 13<br>1/2 - 20  | 50-60<br>55-65   | 65-80<br>75-90                   |
| 5/8 - 11<br>5/8 - 18  | 95-115<br>105-130  | 130-160<br>150-180               |
| 3/4 - 10<br>3/4 - 16  | 165-200<br>185-225   | 235-285<br>260-320               |
| 7/8 - 9<br>7/8 - 14   | 270-325<br>295-360   | 380-460<br>415-505               |
| 1 - 8<br>1 - 12   | 400-490<br>440-535   | 565-690<br>620-755               |
| 1-1/8 - 7<br>1-1/8 - 12   | 495-600<br>555-675   | 800-975<br>900-1095              |
| 1-1/4 - 7<br>1-1/4 - 12   | 700-850<br>775-940   | 1135-1380<br>1255-1525           |
| 1-1/2 - 6<br>1-1/2 - 12   | 1215-1480<br>1370-1660   | 1975-2390<br>2220-2700           |
| NOTES:<br>1. Use anti-seize lubricant on capscrew shank when tightened from head end.<br>2. Use 10% less torque when anti-seize or other lubricant is used on threads.<br>3. Use same torque range for holes tapped in steel. |  |                                  |

**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

**Capscrew grades**








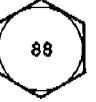


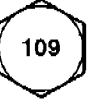
CHANCE RIDES, INC. uses only grade 5 or better capscrews and grade 8 locknuts, with A325 hardened washers for functional loads. The *Grade markings chart* shows the capscrew markings to be found on CHANCE rides. The manufacturer's identification symbols must be present on all functional load carrying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

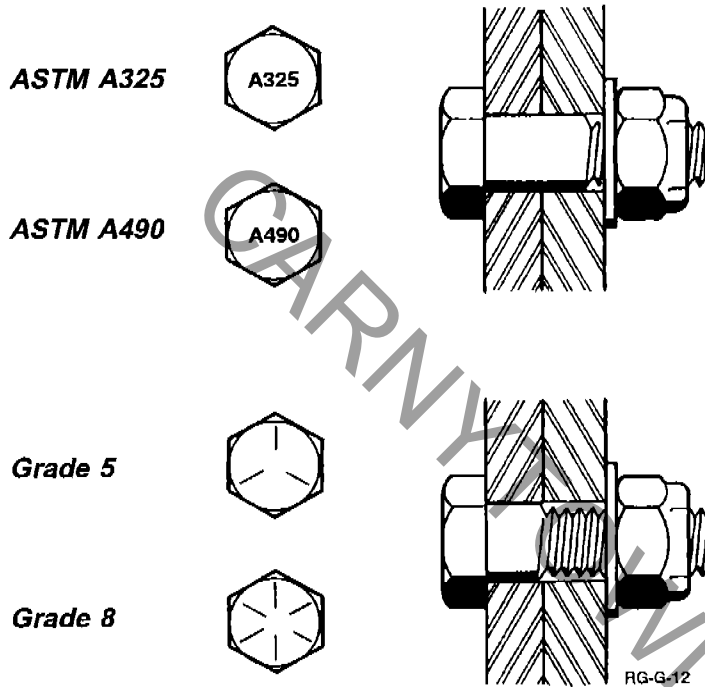


CHANCE RIDES, INC. requires the use of cold-formed hex head capscrews with rolled threads. Hex bolts and hot formed hex head capscrews are not recommended because they may have machined threads and can have die seams along the shank.

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 markings  | Examples of unacceptable markings  |
|---|--|
| SAE J429<br>Grade 5<br>Medium carbon<br>81,000 yield    |  <br>Grade 5.1<br>Low carbon<br>Grade 5.2<br>Low carbon<br>martensitic |
| ASTM A325 Type 1<br>Medium carbon<br>Longer shank and<br>shorter thread<br>length than Grade 5<br>81,000 yield  | <br>ASTM A325 Type 2<br>Low carbon martensitic  |
| SAE J429<br>Grade 8<br>Medium carbon<br>130,000 yield   |  <br>ISO R898<br>Class 8.8<br>Medium carbon<br>92,000 yield        |
| ASTM A490<br>Alloy steel<br>Longer shank and<br>shorter thread<br>length than Grade 8<br>130,000 yield          |  <br>ISO R898<br>Class 10.9<br>Alloy steel<br>130,000 yield        |



**Capscrew comparison**  
 ASTM A325 and A490 cap screws have longer shanks and shorter threads than Grade 5 and Grade 8 cap screws 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.

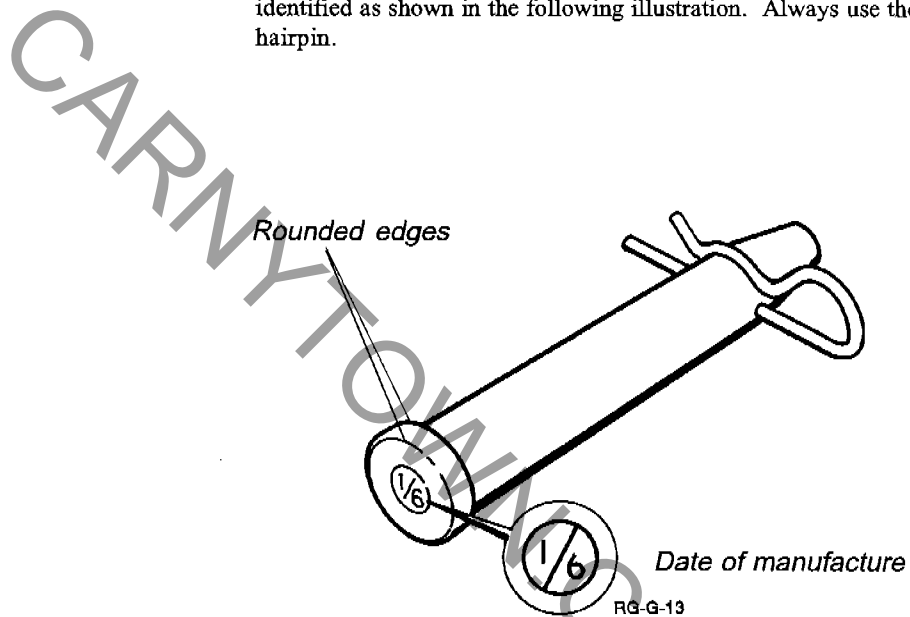


**Pins<sup>3</sup>**

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**



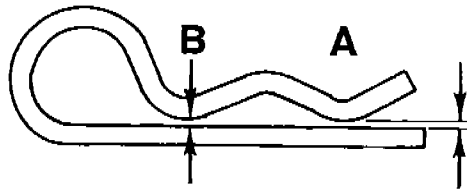
Use care when installing and removing tapered pins. Since these pins are hardened (as are hammers and punches) care must be taken to strike the pin straight on. Striking a pin at an angle can cause the pin to chip, resulting in personal injury. For this reason APPROVED SAFETY GLASSES OR GOGGLES MUST 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**

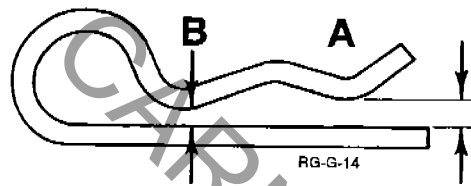
All keepers (R-keys, hair pins, lynch pins, etc.) must be inspected for wear. If a keeper is bent out of shape or "sprung", it must be replaced.

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





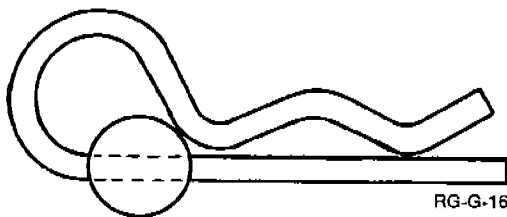
**Acceptable hair pins**  
Dimension "A" equals dimension "B" in a relaxed position



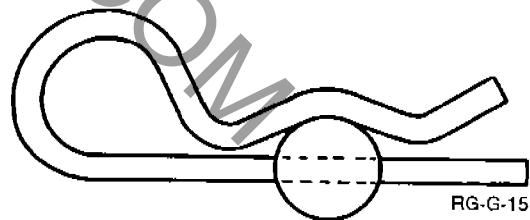
**Unacceptable hair pins**  
Dimension "A" is greater than dimension "B" in a relaxed position

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.



**Incorrect**



**Correct**

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*.



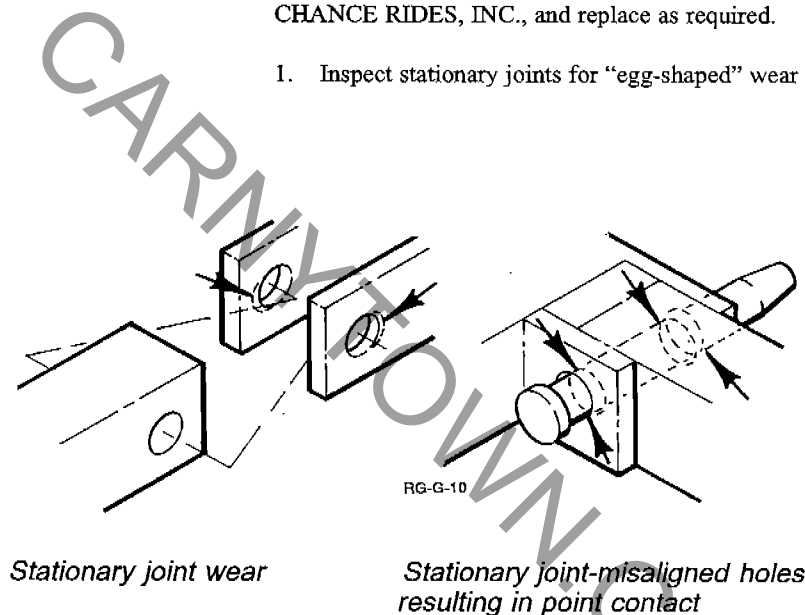
**Return To Section Table of Contents**

## 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.



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.



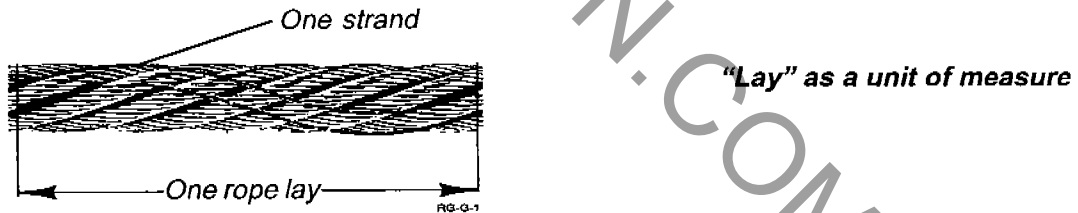
**Cable inspection<sup>6</sup>**

Reference standards:

- 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 that 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 tear-down 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;
2. Three broken wires in any one strand in one lay;
3. Wear of one-third the original diameter of outside individual wires;

6 B090R1128-0 April 28, 1993

4. Physical damage such as kinking, crushing, "bird caging", or any other damage resulting in distortion of the cable structure.



*Kinking*



*Crushing*



*Bird caging*

RG-G-2

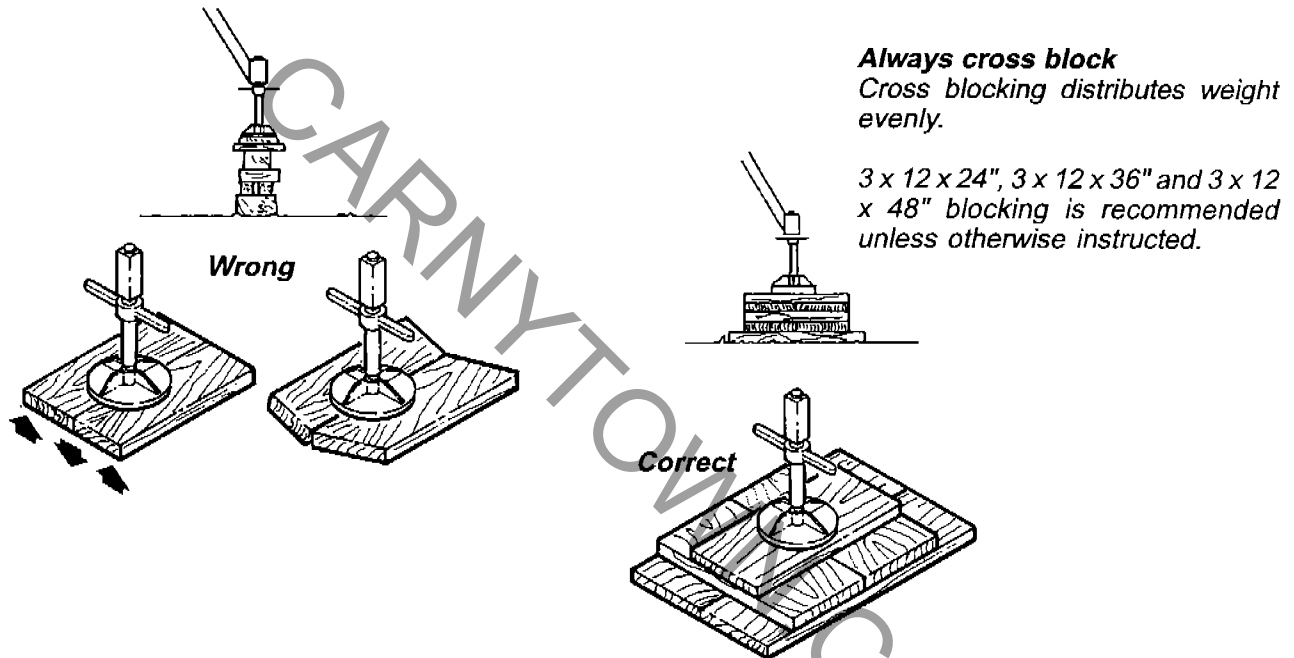
5. Damage due to heat of any kind;
6. Reductions from the nominal cable diameter of more than any of the following:

| 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"             |

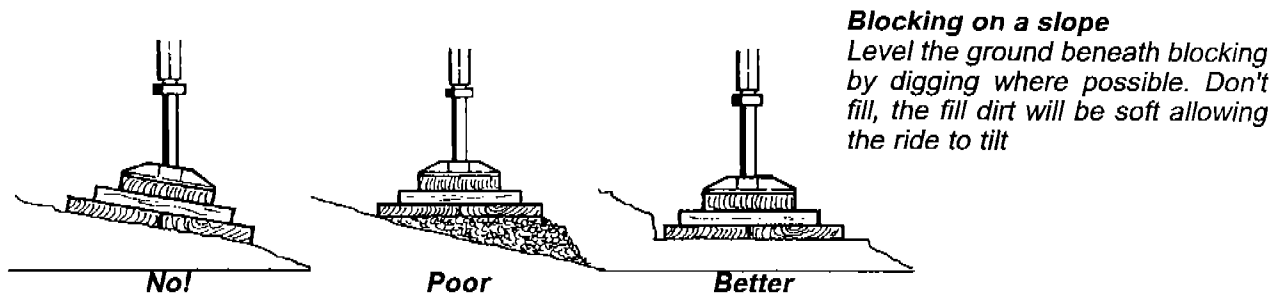


**Leveling and blocking (portable rides only)**

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 at each jack location. Cross blocking distributes weight evenly.

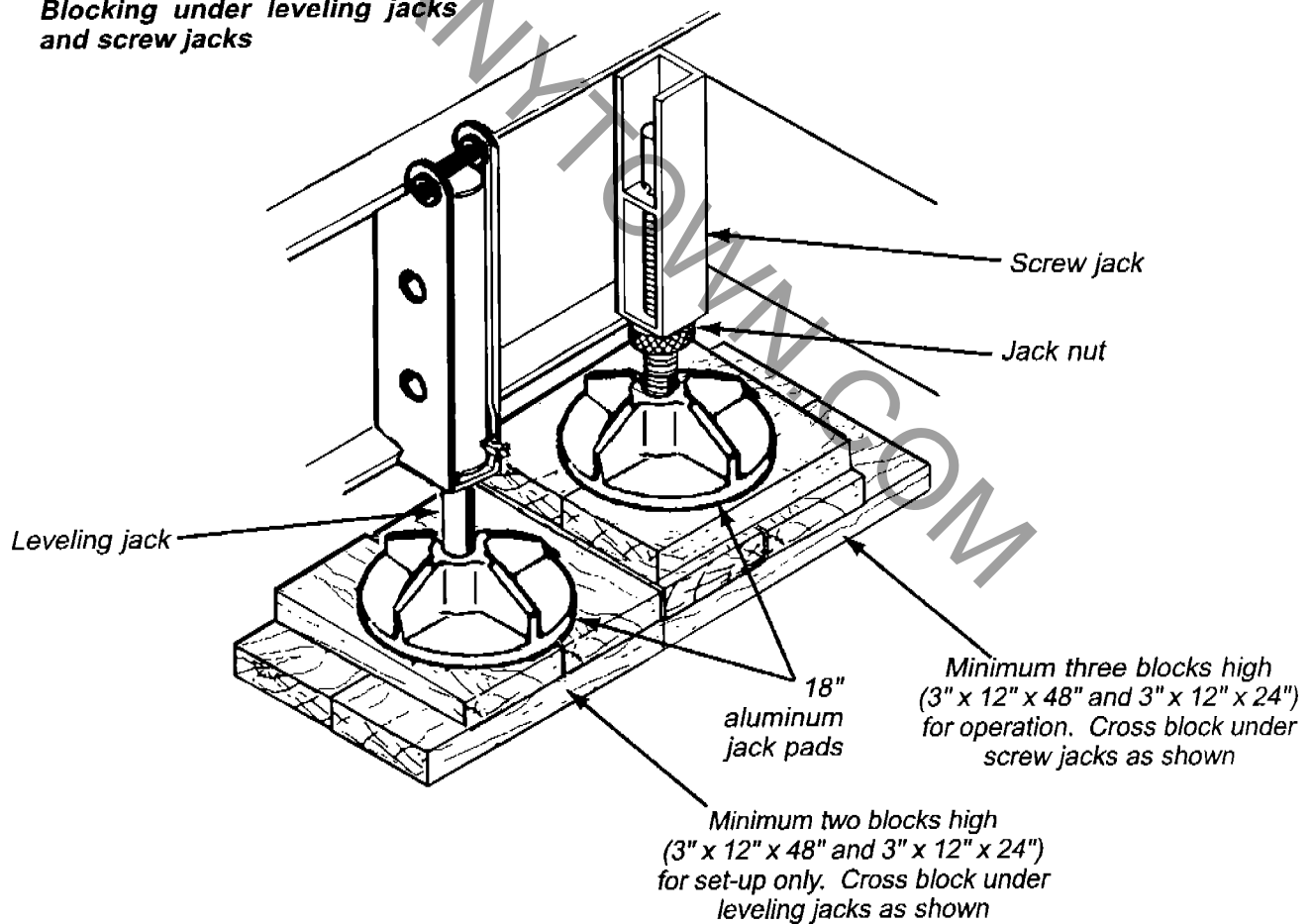


3. Inspect blocking for proper contact with ground.
4. Level ground under blocking by digging where possible, instead of filling. Fill dirt will be soft and allow settling.



5. Inspect hydraulic leveling jacks for leaks at every set-up. The hydraulic jacks are for leveling purposes only. Make sure that all screw jacks are on solid blocking and the jack nuts are tightened. Retract the jacks completely and close the shut-off valves so the entire weight of the ride is on the screw jacks.

**Blocking under leveling jacks  
and screw jacks**



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



## Vehicle inspection

Each seat is equipped with a passenger restraint system which consists of a primary and a secondary restraint bar.

- The primary restraint bar (lap bar) is an over-the-shoulder restraint bar which is secured by a hydraulic lock cylinder.
- The secondary restraint bar (T-bar) engages against the primary restraint bar, securing it in the “down” position. The secondary restraint bar is secured by a redundant air-released mechanical locking mechanism, as well as a mechanical lock which is interlocked with the loading step.

### Daily inspections

1. Inspect and test the operation and locking of every lap bar and secondary restraint bar daily. Any broken, loose or missing parts must be replaced immediately.
2. Check the operation of the lap bar interlock system using the procedure described in the following topic, “Passenger Restraint and Interlock System Operational Check.”
3. Check the overall condition of each seat. Inspection points include, but are not limited to, anti-slip material on the seat floors, lap bar padding and head rests.
4. Inspect all safety placards and signs.
5. Inspect for correct installation of fasteners between the vehicle and the sweep arm. These are six 1-1/4-7 capscrews on ride serial number 414-00298 and on (30mm capscrews on ride serial number 414-00198). Tighten the capscrews to 750 ft-lbs.
6. Visually inspect the vehicle frame structures for cracks, bends and other damage.

**IMPORTANT:** Refer to the NDT Inspection Schedule elsewhere in this manual for specific locations and frequency for NDT inspection.



Return To Section Table of Contents

### Weekly inspections

7. With the back covers removed, check the locking mechanisms for the secondary restraint bar on EVERY SEAT.
  - Visually inspect the entire secondary locking system for loose, missing, worn or damaged components, including the mounting fasteners.
  - Visually inspect the locking teeth and pawls for wear or damage.
  - Check the return springs for correct operation. All pins and fasteners must be in good condition and properly installed
  - Inspect the mounting lugs for damage. All fasteners must be correctly installed.

### Monthly inspections

8. With the back covers removed, check the locking mechanisms for the primary restraint bar on EVERY SEAT.
  - Visually inspect the entire primary locking system for loose, missing, worn or damaged components, including the mounting fasteners.
  - Visually inspect each lock cylinder for oil leakage around the seals.
  - Inspect for signs of external damage, including the spherical bearings in both ends of the lock cylinder.
  - Activate the solenoid and check for smooth movement of the piston rod in extension and compression.
9. Inspect the following on ALL air cylinders monthly.
  - Visually inspect each air cylinder and all lines and fittings for visible signs of leakage.
  - Inspect all components for any signs of external damage, including the mounting ears on each cylinder.
  - Activate each cylinder and check for smooth movement of the piston rod in extension and compression.



### Passenger Restraint Interlock System Operational Check

An interlock system prevents the ride from starting if any of the passenger restraint bars are not down and locked, or if the step is not up and locked. The following check must be made daily to ensure the proper operation of the passenger restraint interlock system



**WARNING: Never load passengers into a seat unless ALL passenger restraint bars on that seat are in good working condition and the passenger restraint interlock system is operating correctly.**

**Do not tamper with or attempt to defeat the purpose of the passenger restraint system or the passenger restraint interlock system. Serious injury to passengers can result.**

1. Move the primary restraint (shoulder bar) switch to the "CLOSE" position. The green indicator light in the switch should flash as the bars are closing and stay on steadily when all bars are down and locked.
2. Move the secondary restraint (T-bar) switch to "CLOSE."

**NOTE:** *The secondary restraint (T-bar) switch is spring loaded and will return to the center ("LOCK") position when released.*

The green indicator light in the switch should flash as the bars are closing and should stay on steadily when all bars are down and locked.

3. The STEP Indicator Light will flash after all the primary restraints (shoulder bars) and secondary restraints (T-bars) are down and locked. Press the Step Control Valve to raise the step.
4. Check the RESTRAINT BAR INDICATOR DISPLAY that all restraint bars are down and locked.



5. Start the ride. It should start and run normally. Stop the ride.
6. With the ride stopped, manually release the secondary restraint bar on only one seat. The RESTRAINT BAR INDICATOR DISPLAY should indicate that the restraint on that seat is not down and locked.



**WARNING: When testing the passenger restraint bar interlock system, if the ride starts with the passenger restraint bar unlatched, STOP THE RIDE IMMEDIATELY to avoid serious injury to the passengers.**

7. Try to start the ride. It should not start. If it does, stop it immediately.
8. Close the secondary restraint bar. The RESTRAINT BAR INDICATOR DISPLAY should not indicate the bar down until it is completely down and locked. If it does, adjustment or repair of the passenger restraint interlock system is necessary.
9. Proceed to the next seat and repeat Steps 6, 7, and 8 until all seats in each row have been tested, ONE AT A TIME.



## Tower, hub, sweep and counterweight arm inspection

1. Inspect the tower, hub, sweep and counterweight arm weldments for cracks or other damage.
2. Inspect the capscrews at the sweep-to-counterweight mounting flange. These capscrews must be tightened to 750 ft-lbs. on ride serial numbers 414-00399 and on (1320 ft-lbs. on ride serial numbers 414-0098 and 414-00298)
3. Inspect the capscrews at the tower mounting flange. These capscrews must be tightened to 260 ft-lbs.

**IMPORTANT:** Refer to the NDT Inspection Schedule elsewhere in this manual for specific locations and frequency for NDT inspection.



## Electrical and lighting inspection

1. Check cable leads, electrical connections and grounding per local code.
3. Test the operator controls, including emergency stop switch, operator presence switch and power switch.
4. Check the electrical jumpers at the tower pivot, the sweep-to-counterweight arm joint and at the vehicle.
5. Inspect the light panels on the sweep and counterweight arm. These must be properly secured.
6. Inspect all quartz flood lights for installation of special clear tape on outside of lens<sup>7</sup>.

7 B090R1133-0 August 6, 1993



## Trailer or park base inspection

1. Inspect the trailer or park base structures for visible cracks or damage.
2. Inspect the trailer or park base outriggers. The jack screws must be snug.
3. Inspect the mounting locations on park model rides at regular intervals.
4. Visually inspect the welds on the tower lift hydraulic cylinder support frame on portable model rides.

**IMPORTANT:** Refer to the NDT Inspection Schedule elsewhere in this manual for specific locations and frequency for NDT inspection.

## Platform and fence inspection

1. Inspect hand rails, ramps, steps and walkways.
2. Inspect all gates. Self-closing gates must operate properly.
3. Inspect all entrance and exit signs.
4. Inspect all safety signs and placards.
5. Inspect floors and jackstands for proper installation and leveling.



## Hydraulic system inspection

The hydraulic system operates the leveling jacks and tower lift cylinder on the portable model.

1. Inspect the entire hydraulic system, including hoses, tubes, fittings and other components for leaks.

## Air system inspection

1. Check for the proper air pressure settings at the trailer or park base:
  - 120 psi at the reservoir
  - 80 psi at the park brake regulator
2. Check for the proper air pressure settings at the vehicle:
  - 120 psi at both reservoirs
  - 90 psi at the primary restraint bar (lap bar) "up/down" regulator
  - 30 psi at the primary restraint bar "down" regulator
  - 90 psi at the secondary restraint bar (t-bar) "up/down" regulator
  - 90 psi at the secondary restraint bar ratchet release regulator
3. Check the brake air system, including hoses, tubes, fittings and other components for leaks.
4. Check the vehicle air system, including hoses, tubes, fittings and other components for leaks.



Return To Section Table of Contents

### NDT Inspection Schedule

| Component               | Inspection point<br>(Location)                 | Initial NDT<br>Interval |
|-------------------------|--|-------------------------|
| Vehicle arm             | Outboard root of gussets                       | 1 year                  |
| Counterweight arm       | Outboard root of gusset                        | 1 year                  |
|                         | Bolt block to arm                              | 1 year                  |
|                         | Vehicle arm to arm hub at corners of arm       | 1 year                  |
| Tower hinge<br>(lower)  | Weld around doubler to tower wall              | 1 year                  |
|                         | Weld of lugs to doubler                        | 4 yrs.                  |
| Tower hinge<br>(upper)  | Weld around doubler to tower wall              | 1 year                  |
| Vehicle                 | 4" x 12" Lateral tube<br>(Weld to back wall)   | 1 year                  |
|                         | 4" x 12" tube<br>(Fillet welds & gusset welds) | 1 year                  |
|                         | Upper backwall 2" x 4" tube at mounting plate  | 1 year                  |
| Vehicle arm adapter box | Upper & lower edge facing curbside             | 1 year                  |
| Vehicle arm adapter box | Stiffeners welded to circular barrel           | 1 year                  |



Return To Section Table of Contents

## 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.**  
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 P.O. Box 12328  
 Wichita, KS 67277-2328

*INVERTER Service Manual*  
 24200000

The *INVERTER Service Manual* includes the Set-up Manual, Operation Manual (#24200000), Maintenance Manual and Parts Catalog

1. *Field Performance Testing Of Amusement Rides*  
 B090R1002-0  
 May 14, 1986
2. *Non-destructive Testing*  
 B090R1022-0  
 March 21, 1988
3. *General Safety - Tapered Pins*  
 B090R1056-0  
 February 9, 1990
4. *Replacement And Torque Requirements For Functional Load Carrying Capscrews*  
 B090R1075-0  
 May 25, 1990
5. *Manufacturer's Specifications*  
 B090R1126-0  
 March 12, 1993



Return To Section Table of Contents

6. *Cable Inspection*  
B090R1128-0  
April 28, 1993

7. *Flood Light Safety*  
B090R1133-0  
August 6, 1993

The following Product Improvement Notice is not referenced in the preceding text. The product improvement is not mandatory and may be incorporated at the owner's discretion.

*Rust Stain Remover*  
P090R1179-0  
September 22, 1997



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**Return To Section Table of Contents**

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[Return To Section Table of Contents](#)