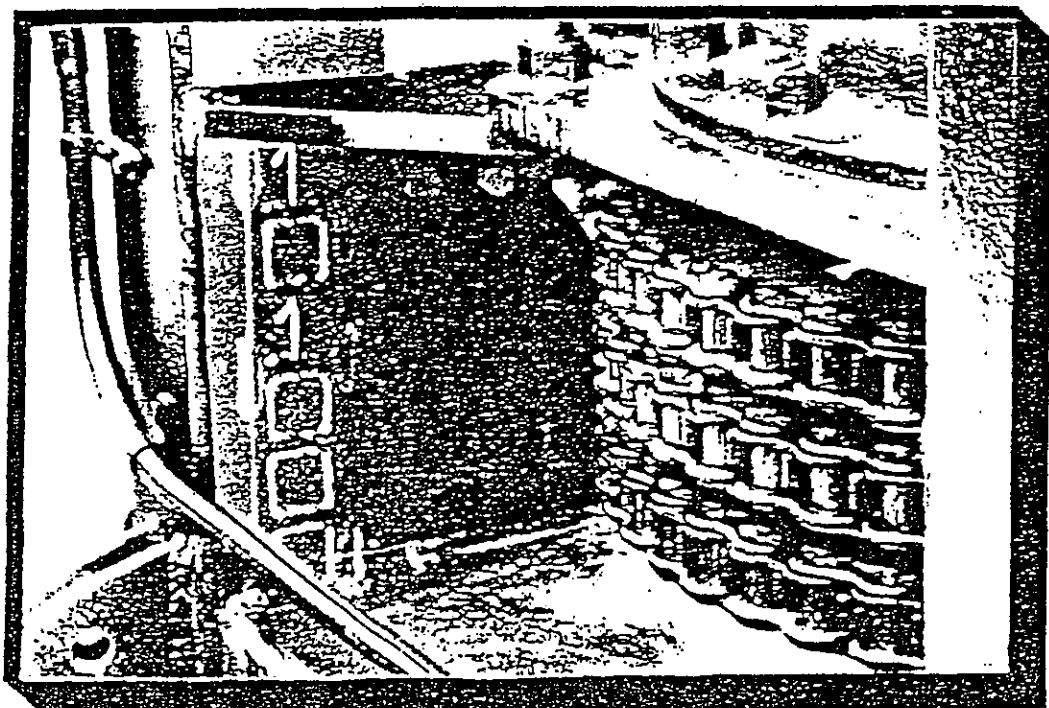
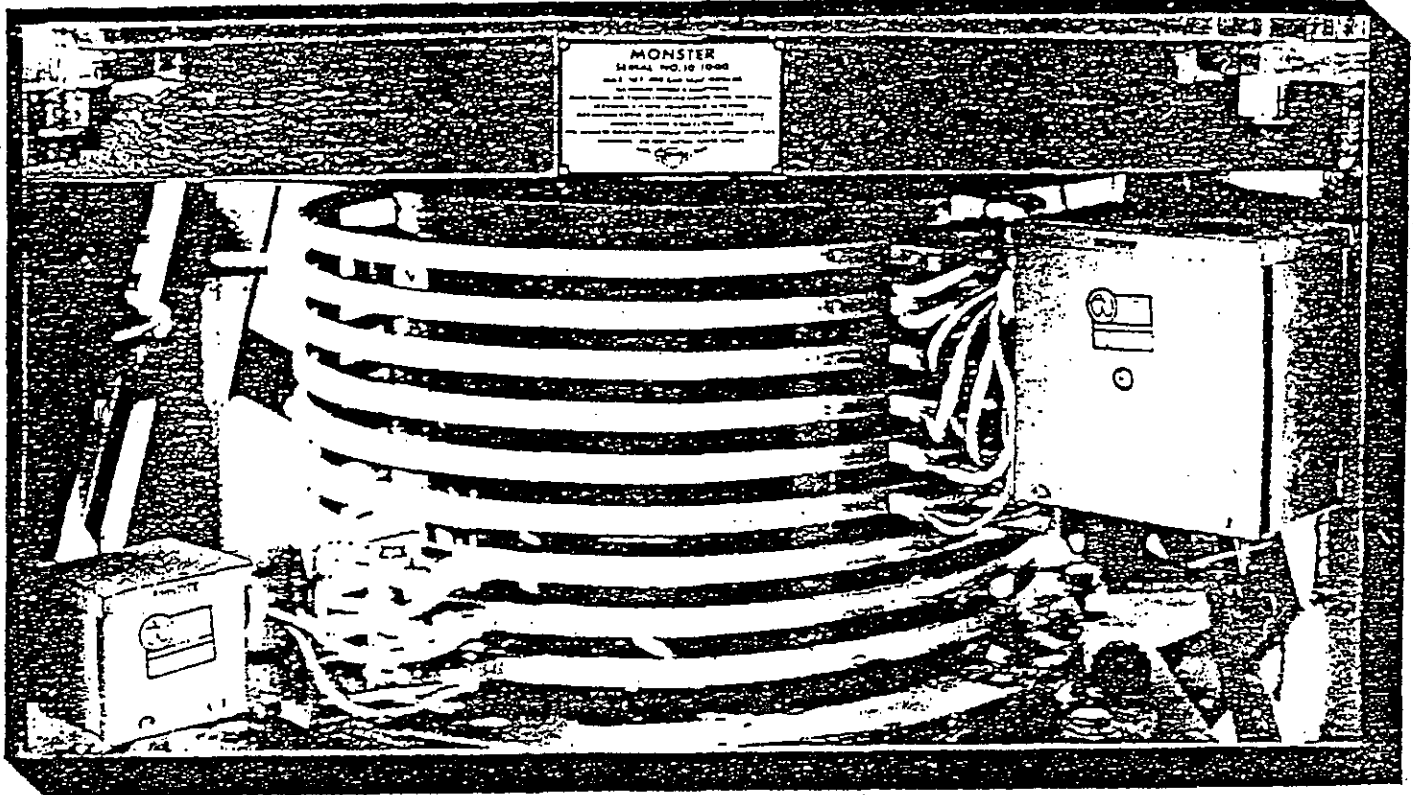




## LOCATION OF MONSTER SERIAL NUMBERS

NOTE:  
WHEN ORDERING PARTS, PLEASE  
GIVE SERIAL NUMBER OF YOUR  
MACHINE ALONG WITH THE PART  
NUMBERS FROM THIS CATALOG.



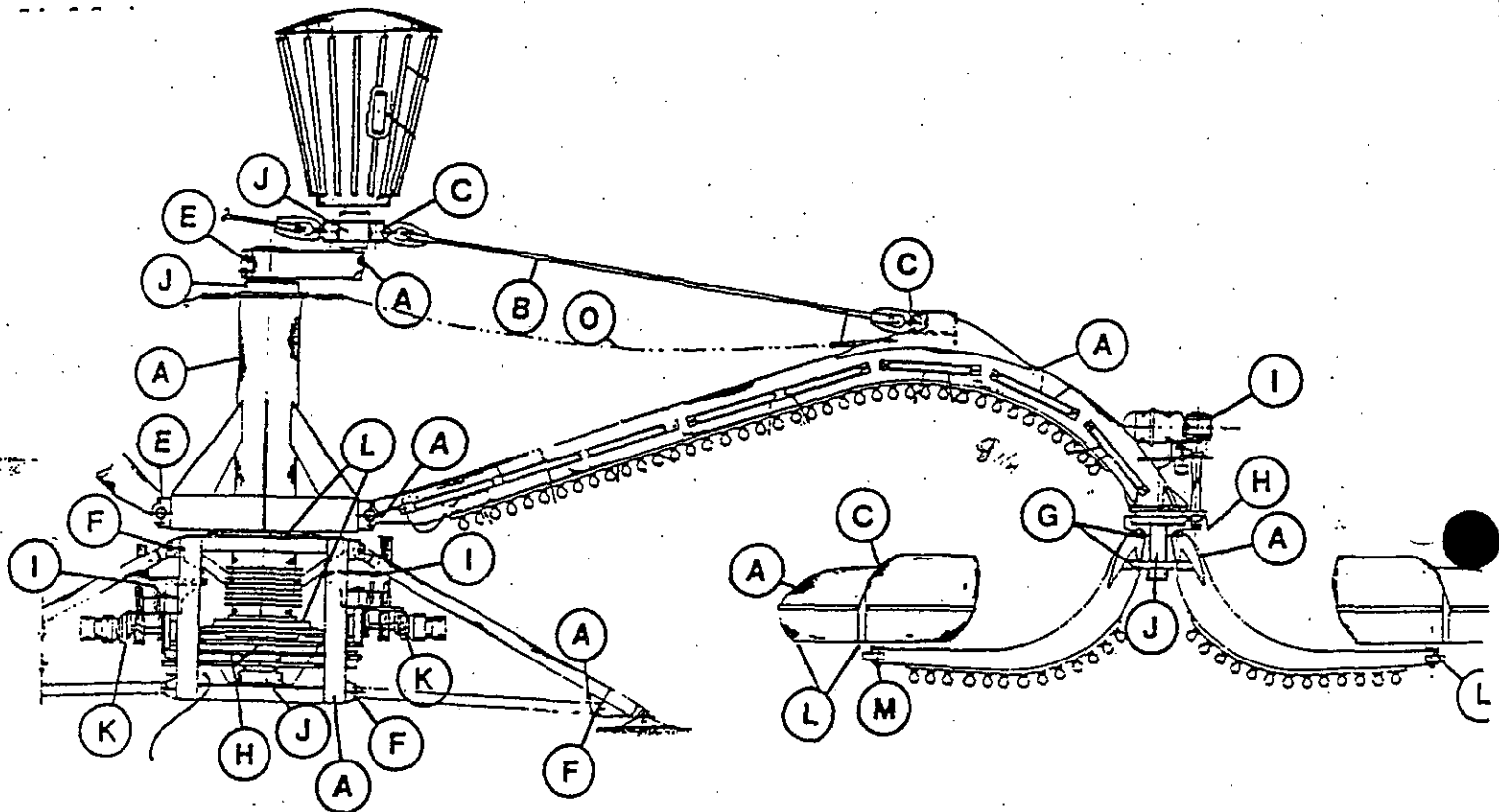
THE NAME PLATE, SPECIFYING THE SERIAL NUMBER,  
CAPACITY AND SPEEDS OF THE RIDE, IS LOCATED ON  
THE UPPER FRONT CAGE CHANNEL FACING THE

OPERATOR. THE SERIAL NUMBER IS ALSO WELDED  
ON THE RIGHT HAND SURFACE OF THE LEFT HAND  
CORNER POST OF THE CAGE.



# THE MONSTER INSPECTION CHECK LIST

Sales & Service  
ORI IND.  
PO Box 15029  
Salem, OR 97309  
Phone: 503-588-0984  
FAX: 503-588-1127



- A. Inspect for weld cracks and structural damage.
- B. Check support rods for equal tension. If bent replace. Inspect threads for cracks, check thrust washer for wear.
- C. Inspect swivel block needle bearings yearly, check for worn thrust washers, check attaching pin and nuts for tightness. Check for proper lubrication.
- D. Check safety cable for condition, broken strand, corrosion and adjustments. Cable should not bear weight of sweep when extended. Attaching points should move freely. Cable should be replaced if sweep is dropped.
- E. Check bolts for condition and correct tightness. Bolt should be replaced if torqued to max. after removal. Inspect condition of pillow block - hinge pin, if damaged or loose - replace.
- F. Check condition of attaching pins & fastener. Pin should be cotter keyed and not half pinned. Inspect for hole enlargement and repair if needed.
- G. Inspect for loose bolts. If bolts are torqued to max. Bolt should be replaced after removal. Inspect safety pin for fastener. Fastener may be half pin or cotter key.
- H. Check for loose or worn chain; repair or replace. Make sure chain does not rub guards, adj. as needed. Check all sprocket fasteners or securing members.

- I. Check oil level in gear housing, change yearly. Inspect oil level of fluid clutch and torque arm snubber in spider gear drive.
- J. Check all rotating hubs for play and rough bearing. Repair as necessary.
- K. Check all hyd. attaching pins & bolt for wear or looseness. Replace or tighten as needed. Inspect drive belts for wear, cracks or looseness. Repair as necessary.
- L. Check for wear in bushings, joints, hinges and linkage.
- M. Inspect spindle for wear and fastener for condition.

## N. General Information:

400 lbs. per car.

Rotation 8 RPM ccw

Eccentric 11 RPM cw

Spiders 15 RPM cw

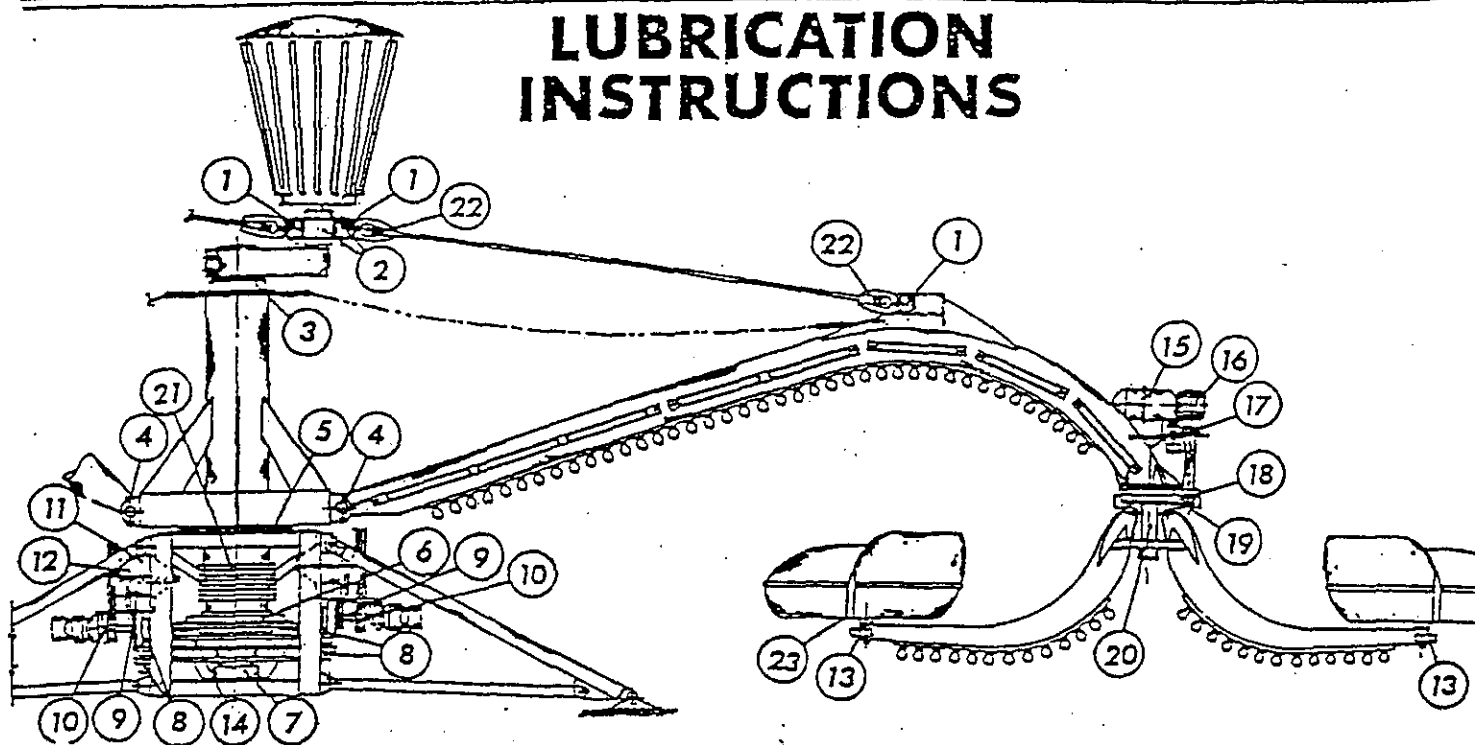
Do not operate over 50% of recommended RPM in reverse.

Note: (1) The monster requires a routine checking for loosening bolts. We recommend every 30 days of operation.

(2) Many causes of mechanical repair have resulted from failure to follow the recommended lubrication frequency or failure to follow the lubrication chart. We cannot overstate the importance of following the factory lubrication instructions.



# LUBRICATION INSTRUCTIONS



LUBRICATION INTERVAL: THE ABOVE TABLE OF LUBRICATION INTERVALS REFER TO AVERAGE OPERATING CONDITIONS WITH GREASE SEALS INT

NO.	DESCRIPTION OF PART	BEARING TYPE	
1	SWIVEL BLOCKS	ANTI-FRICTION	(A)
2	ECENTRIC HUB	ANTI-FRICTION	(B)
3	ECENTRIC TUBE UPPER BEARING	ANTI-FRICTION	(B)
4	HINGE PIN BUSHING	BRONZE	(A)
5	HINGE COLUMN UPPER BUCHING	BRONZE	(A)
6	HINGE COLUMN LOWER BUSHING	BRONZE	(A)
7	ECENTRIC TUBE LOWER BEARING	ANTI-FRICTION	(B)
8	DRIVE SHAFT BEARINGS	ANTI-FRICTION	(C)
9	HYDRAULIC DRIVE INNER BEARING	ANTI-FRICTION	(C)
10	HYDRAULIC DRIVE OUTER BEARING	ANTI-FRICTION	(B)

NO.	DESCRIPTION OF PART	BEARING TYPE
11	GEAR CASE UPPER BEARING	ANTI-FRICTION
12	GEAR CASE	ANTI-FRICTION
13	CAR SPINDLE BUSHINGS	NYLON OR BRONZE
14	MAIN DRIVE CHAINS	
15	HYDRO SHEAVE	
16	SPIDER MOTOR GEAR BOX	ANTI-FRICTION
17	DRIVE SHAFT UPPER BEARING	ANTI-FRICTION
18	DRIVE SHAFT LOWER BEARING	ANTI-FRICTION
19	SPIDER DRIVE CHAINS	
20	SPIDER HUB ASSEMBLY	ANTI-FRICTION

(A) DAILY OR EVERY EIGHT HOURS DURING HEAVY OPERATIONS.

(B) LIGHTLY EVERY TWO WEEKS.

(C) EVERY THREE MONTHS.

(D) CHECK EVERY MONTH, CHANGE EVERY YEAR. USE E. P. 90

(E) KEEP ALL MOVING PARTS OF THE CARS AND SUPPORT RODS OILED DAILY.

(F) CHANGE OIL IN HYDRO-SHEAVE EVERY 4000 HOURS OR ONCE A YEAR. USE 10W ABOVE 10 DEGREE F. & 5W BELOW 10 DEGREE F. OIL IS TO BE HEAVY DUTY TO MEET A. P. I. SPECIFICATIONS CLASS M. S.

(G) LUBRICATE DRIVE CHAINS EVERY TWO WEEKS WITH AN ROVED LUBRICANT SUCH AS CHEVRON FINION GREASE 1 ROTANIUM POWER-LUBE NO. 91665 OR EQUIVALENT.

(H) USE A COMPOUNDED GEAR LUBE WITH AN E. P. ADDATTY COMPLY WITH AGMA-7 E. P. OR AGMA-8 E. P. SPECIFICA

## NOTES:

\*\* USE A MULTI-PURPOSE WATER RESISTANT GREASE WIT ACCEPTED EXTREME PRESSURE ADDOATIVE SUCH AS CHEV R. P. M. MOLYGREASE NO. 1 OR MOBIL GREASE SPECIAL IN PRESSURE FITTINGS.

KEEP LIGHT RINGS CLEAN AND FREE OF CONTAMINANTS AS GREASE, OIL, ETC.

# MONSTER SWIVEL BLOCK BEARINGS

IT HAS BEEN BROUGHT TO OUR ATTENTION  
THAT SEVERAL PREMATURE SWIVEL BLOCK  
BEARING FAILURES HAVE OCCURED DUE TO  
LACK OF LUBRICATION.

WE MUST EMPHASIZE THAT SWIVEL BLOCKS  
(PR-153) REQUIRE LUBRICATION ONCE DAILY  
OR EVERY EIGHT HOURS DURING PERIODS OF  
HEAVY OPERATION, AS PER ORIGINAL LUB-  
RICATION INSTRUCTIONS. ALSO WE RECOM-  
MEND THAT THE SWIVEL BLOCKS BE RE-  
MOVED, THE BEARINGS CLEANED, THOROUGHLY  
INSPECTED AND REPACKED AT PERIODS NOT  
TO EXCEED 6 MONTHS.

MONSTER BULLETIN			
DRAWN BY: AEA	SCALE: ~	NO. REQ'D.: ~	MATERIAL: ~
DATE: 3-30-70	NEXT ASSY.: ~	SDS. NO.: SDD. BY NO.:	EFF. W/SN: 10100 & UP EFF. W/SN:

Drg. No. P1-70

THE RECOMMENDED OPERATING PROCEDURES FOR STARTING, RUNNING AND STOPPING THE MONSTER RIDE ARE AS FOLLOWS :

### STARTING

ROTATION — AFTER THE LAST SWEEP OR CAR HAS BEEN LOADED AND SECURED, ADVANCE ROTATION CONTROL LEVER IN A SLOW, EVEN MOVEMENT TO ATTAIN THE MAXIMUM ROTATION RPM IN NOT LESS THAN  $\frac{3}{4}$  OF 1 REVOLUTION.

CROSS ARMS — WHILE ADVANCING ROTATION CONTROL LEVER, START CROSS ARMS ROTATING AND CHECK VISUALLY EACH SWEEP AS IT PASSES.

ECCENTRIC — THE ECCENTRIC IS STARTED IN THE SAME MANNER AS THE ROTATION. MAINTAIN A STEADY ADVANCEMENT OF THE CONTROL AS TO REACH FULL RPM IN NOT LESS THAN  $\frac{3}{4}$  OF 1 REVOLUTION.

### RUNNING

THE MAXIMUM RPM AND DIRECTIONS LOOKING DOWN FROM THE TOP OF THE RIDE ARE AS FOLLOWS :

ECCENTRIC — 11 RPM CLOCKWISE

ROTATION — 8 RPM COUNTER-CLOCKWISE

CROSS ARMS — 15 RPM CLOCKWISE

FOR REVERSE OPERATION REDUCE ROTATION AND ECCENTRIC SPEEDS A MINIMUM OF 50%. DO NOT EXCEED THESE SPEEDS.

### STOPPING

IN STOPPING USE REVERSE APPLICATION OF STARTING PROCEDURE.

#### MONSTER OPERATING PROCEDURES

DRAWN BY: AEA	SCALE: ~	NO. REQ'D.: ~	MATERIAL: ~
DATE: 1-12-77	NEXT ASSY: ~	SDS. NO.: ~	ROD BY NO.: ~

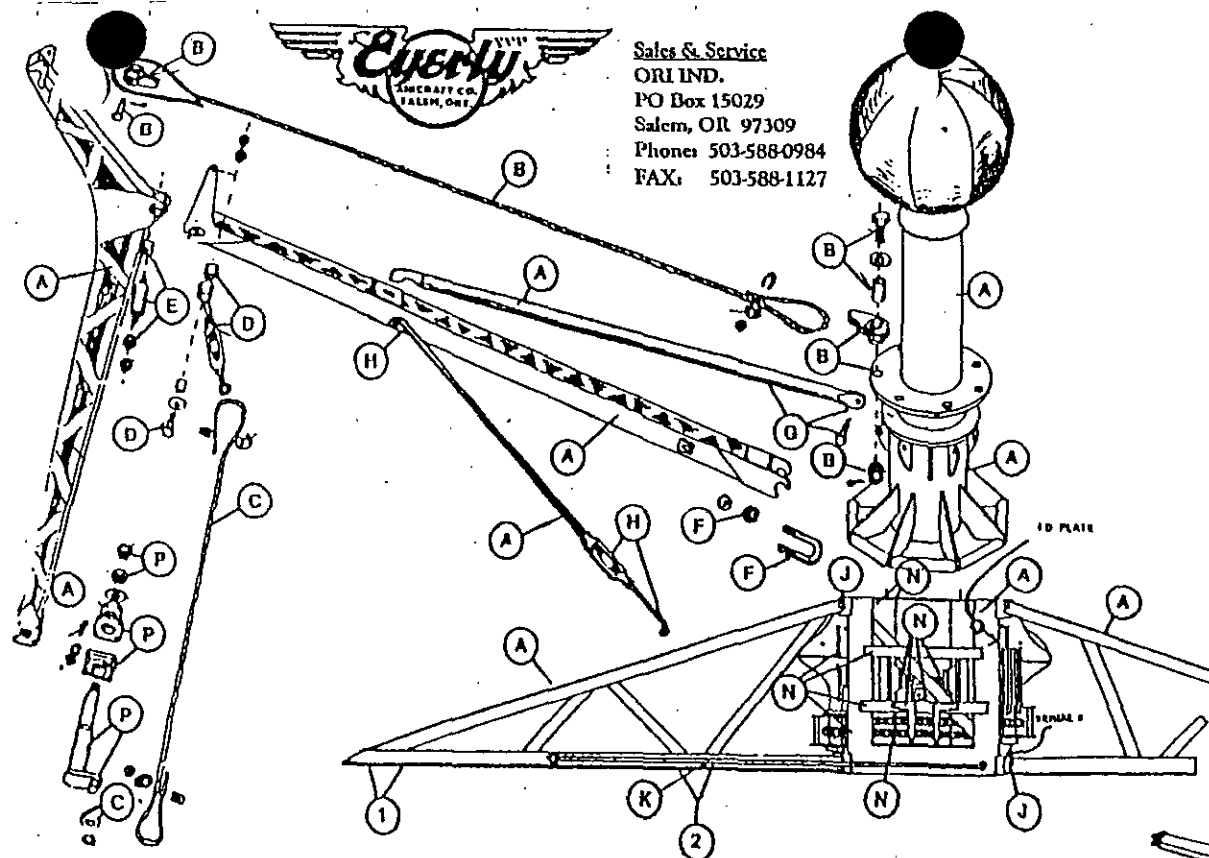


Dwg. No P-4-77

P-4-77



Sales & Service  
ORI IND.  
PO Box 15029  
Salem, OR 97309  
Phone: 503-588-0984  
FAX: 503-588-1127



A. Inspect for weld cracks, structural damage. Car frame tubing should be checked for possible internal corrosion and deteriorated floor boards.

B. Inspect lift cable condition and thimbles for wear. Replace cable if broken strands are found, high corrosion, etc. Replace thimbles at .0625 maximum wear. If galling has occurred or if thimble is damaged, inspect cable clamps — 3 to each end (proper application). Check attaching bolts for condition and if working, replace as necessary with Grade 8 or better.

C. Inspect car leveling cable for condition and check cable clamps (min. 2 each). Inspect spindle crank for proper snap ring and thimble condition. Replace as required — cable thimble to have .0625 maximum wear.

D. Inspect car leveling cable turnbuckle if equipped or new style (not shown) spring cushioned linkage for condition and usage. Check bushing and bolt for wear and replace as required.

E. Inspect sweep hinge, nuts and bushings — maximum wear .065 (1/16) inch. Replace if threads damaged or excessive wear exists. Special tapered nut.

F. Inspect inner sweep U-Bolt for damage. — Thread wear or poor nuts. Replace as required.

G. Inspect sweep support rod for damage, pin hole enlargement and pin for damage, and proper safety key. Ifs may be reamed to maximum 1/8" oversize — 1/16" and 1/8" oversize pins available.

H. Check sweep tie rods for condition and turnbuckle for thread wear, etc. Inspect both ends and thread area for fractures. Rods are to be snug, over-tightening will cause failure of the tie rod. Attaching holes for the rod should be inspected and repaired if excessive wear is found.

J. Check mudsill attaching pins for condition and proper safety. Do not use hak pins in mudsill pins — pins rotate and push hakpins out. If mudsill attaching holes are worn, replace pin with factory 1/16" or 1/8" oversize pin only. Maximum oversizing is 1/8".

K. Inspect mudsill tie rods for condition of threads, broken or fractured ends, bearing collar wearing on rod, nut, etc. Also inspect attaching points at cage and mudsill for overloading or fractures. Replace or repair as necessary.

L. Inspect clutch/brake linkage for condition of attaching holes, pins, bolts and for bends, etc. Straighten, install oversized bolts in enlarged holes, repair as necessary.

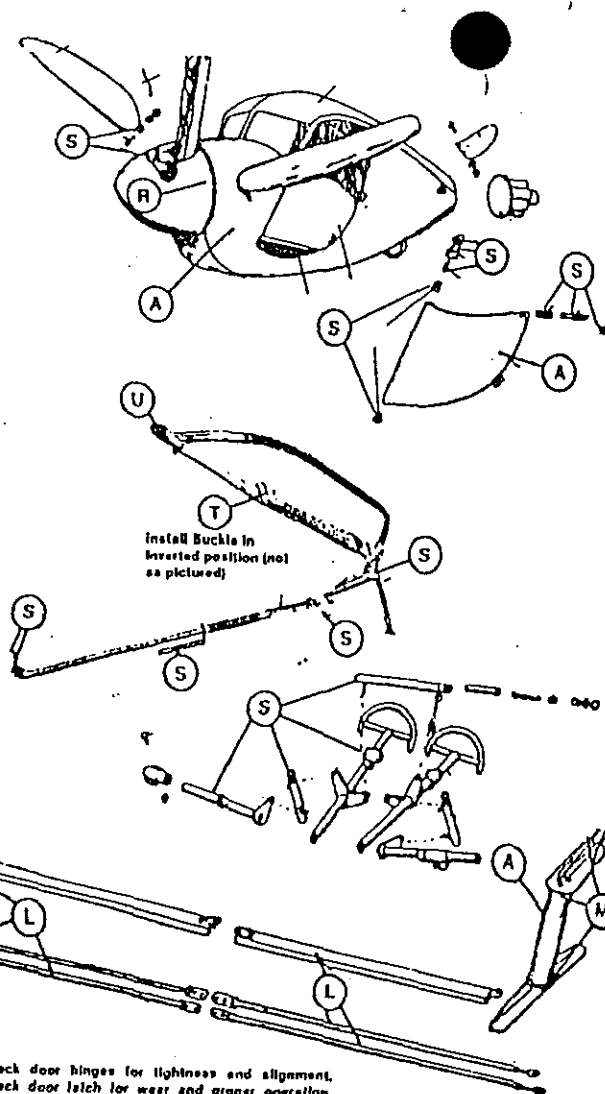
M. Inspect control stand for wear in linkage and worn ratchets and handles. Repair, replace as required.

N. Inspect bolts in cage for looseness — tighten, oversize bolt if holes are enlarged. Check for properly adjusted chains and aligned gear reduction units. Also check clutch linkage for loose bolts oversized holes and proper adj. of clutches and brakes. Replace linkages if required.

NOTE: Fly-O Planes are equipped with non-reversing pawls and must be in working order (Bulletin F-1)

P. Check car spindle for condition of shaft, thread area and keyway — check for crack and replace if required. Check condition of car revolving crank arm. Check spindle bearings for condition, lubrication and tight mounting bolts and bearing lock collar. Replace bearing if turning in housing. Check car spindle nuts for condition. Inner nut is special as it has a reversed taper and must be installed with taper toward car hub. Check condition of car lockwasher.

R. Inspect car hub and make sure that end of spindle is slightly recessed in hub. If flush, then install special factory spacer lockwasher. If shall protrudes more than 1/8", the hub or spindle is worn beyond maximum tolerance and must be repaired.



S. Check door hinges for tightness and alignment. Check door latch for wear and proper operation. Check all steering linkage and safety belt bar mechanism for wear, bent rods, broken or missing springs or enlarged bolt holes and undersized bolts. Repair or replace as necessary. The factory has provided a self-leveling assist kit to help return the wings to a flat position (Bulletin P-8).

T. Safety belt should be installed with the belt buckle between the wrap of the belts so that the upper belt prevents the buckle from being released by the passengers.

U. Should the secondary safety pin hole become enlarged, weld up with mild steel rod and redrill to fit pin.

General Information:  
Maximum weight per car 340L. Maximum RPM 11ccw (Std. Model)

Blocking:  
Ride center must be floated at all times, evenly distribute weight on outer end of mudsill at area indicated by 1 (one). Quarter blocking located at 2 (two) should be finger tight and checked often to prevent weight from transferring to quarter blocks due to settling of outer blocks. NOTE: Blocking should be 2 x 4 or better.

MANUFACTURERS OF AMUSEMENT RIDES



LEE U EYERLY  
1947-1963

JACK V. EYERLY  
PRESIDENT

P. O. BOX 12155  
SALEM, OREGON 97309

January 18, 1982

TO: ALL MONSTER OWNERS

Subject: Recommended repair/modification of MONSTERS with structural fatigue cracks.

Reference: Eyerly letter of June 12, 1981, reminding recommended inspection of MONSTER rides.

#### CAUSES OF STRUCTURAL CRACKING PROBLEM

We have completed our review and evaluation of the MONSTER structural crack inspection reports that we have received from MONSTER owners. We have also conducted analysis here at the factory on the structural cracks found in a MONSTER ride that has been in service a number of years. Additionally we have correlated the cracking problem with a number of maintenance/operation related problems that have come to our attention over the years. As a result of this analysis we have determined the cause of the structural fatigue damage (cracking) found in a number of the MONSTER rides to be combinations of the following factors:

- (1) Operation with excessive loads, combined with poor maintenance such as excessive play in critical joints due to loose bolts, excessive wear clearances allowed to develop in critical bushings, uneven footing support elevations.
- (2) Corrosion fatigue effects occurring as a result of corrosion allowed to occur with the passage of time in relatively highly stressed regions of key structural elements of the ride.
- (3) Operation with excessive loads combined with shock and vibration resulting from imbalanced passenger loadings which constitutes improper use of the ride.
- (4) Operation with excessive loads and operating the ride at excessive speeds.

It has been determined that the fatigue damage has not been caused by the MONSTER ride design or the materials or fabrication procedures used in its construction. It has also been determined that the extent of fatigue damage does not correlate with age or date of manufacture - chronological age alone is not an appropriate guide to the expected degree of fatigue damage.

#### RECOMMENDATIONS TO EXTEND USEFUL LIFE OF FATIGUE DAMAGED MONSTERS

A number of owners with structurally cracked MONSTERS have requested from us recommendations on repairs and modifications that could be expected to increase their safety and life. The engineering department at Eyerly Aircraft Company has addressed this question and outlined a conservative strategy of repairs and structural reinforcements (that can be incorporated in the field) designed to meet these objectives. We are presently preparing the detailed drawings and

specifications required to derive the resulting structural modification kit for field installation. Some important benefits of incorporating the recommended modifications

(1) the increased ability of the MONSTER to tolerate future maintenance/operation problems (this benefits presently undamaged MONSTERS also), (2) the modifications reduce stresses in important partially fatigue damaged locations thereby extending the useful fatigue life. As a conservative approach, Eyerly Aircraft Company recommends installation of the structural modification kit on all MONSTER rides even those showing no apparent signs of fatigue damage or structural cracking. Detailed instructions and specifications outlining the field installation of the kit elements will be included with the kit as will be the ribs, gussets, reinforcements, bushings, bearings, pads, etc., that are required to be installed.

#### MODIFICATION ACTIVITIES TO BE CONDUCTED BY MONSTER OWNERS

Repair of fatigue damaged MONSTERS and installation of the structural modification kit is not a small job and will take some time, however, the job can be performed in the field by competent personnel. Included in the activities to be performed by the owners are:

- (1) Fairly complete disassembly including removal of cross arms and sweeps and disassembly of cage (removal of center hinge column).
- (2) Cleaning/sandblasting of at least the critical areas and removal of corrosion.
- (3) Visual and magnetic particle inspection (and if/as required select ultrasonic inspection to be performed by competent professionals to full define significant cracks in structurally critical areas.
- (4) Carbon arc/air (air/arc) removal of cracks and weld repair of structurally critical cracks by a competent certified welder.
- (5) Fitting and welding of the new structural modification kit structural elements to the existing MONSTER structure to be performed by a competent certified welder.
- (6) Reinspection including Non Destructive Testing of repaired and new weld areas.
- (7) Repaint at least the structurally critical areas with a suitable corrosion prevention primer and paint system.
- (8) Reassembly and checkout of the MONSTER ride. Important structural parts found to be excessively damaged should be replaced with factory new replacement parts.

#### EXPECTED SCHEDULING FOR MODIFICATION KIT AVAILABILITY

Immediately following completion of our modification kit engineering/design work, we plan to install a prototype structural modification kit on a MONSTER here at the factory and subject it to test. Upon completion of this, we plan to offer the complete structural modification kit including instructions, specifications, drawings, and kit parts to be installed. It is presently estimated that the modification kit will be available on March 19, 1982. Inasmuch as we have not yet completed the engineering for the kits, we have not had the opportunity to engage in their costing. As soon as costing is determined all MONSTER owners will be advised and orders accepted for a production run of the required materials.

EYERLY AIRCRAFT COMPANY



MANUFACTURERS OF AMUSEMENT RIDES



LEE U. EYERLY  
1892 - 1963

JACK V. EYERLY  
CHAIRMAN OF BOARD

JON V. EYERLY  
PRESIDENT

P.O. BOX 12155  
SALEM, OREGON 97309

MONSTER BULLETIN

INSPECTION, OPERATION AND MAINTENANCE BULLETIN FOR  
MONSTERS NOT OUTFITTED WITH THE STRUCTURAL REINFOR-  
CEMENT KIT.

PREPARED FOR  
ALL MONSTER OWNERS OPERATING MONSTERS NOT OUTFITTED  
WITH THE STRUCTURAL REINFORCEMENT KIT.

PREPARED BY  
EYERLY AIRCRAFT COMPANY  
P. O. BOX 12155  
SALEM, OREGON 97309

SEPTEMBER 27, 1982

MONSTER BULLETIN

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## INTRODUCTION.

This important special MONSTER Bulletin deals with recommended periodic inspection programs and operations/maintenance recommendations intended to (1) minimize fatiguing effects that might occur during operation of the ride thereby extending its useful life. (2) allow the early detection of fatigue damage and structural cracking, should it occur, well before the structural integrity of the ride has become significantly affected. (3) indicate means of safely repairing the ride, should significant structural damage be found, to fully restore structural adequacy and safety to the ride. Also dealt with in this Bulletin is the recommendation for the replacement of certain specific MONSTER parts with factory replacement parts of a new and improved design. This Bulletin strictly applies to MONSTERS not presently outfitted with the MONSTER STRUCTURAL REINFORCEMENT KIT.

It is assumed that all MONSTER owners presently operating MONSTERS have already fully complied with the June 12, 1981 MONSTER Bulletin that was sent out by Eyerly Aircraft Company. This June 12, 1981, MONSTER Bulletin required a complete NDT inspection of structurally critical areas of the ride by qualified NDT professionals. Eyerly Aircraft Company recommends that MONSTERS with signs of fatigue damage or fatigue cracking not be operated until a factory approved repair can be accomplished.

A very significant aspect of this special Bulletin to be highlighted for emphasis is the requirement for a detailed and thorough annual inspection of all the structurally critical areas and locations using the magnetic particle NDT technique. This full annual NDT inspection requirement to apply to those MONSTERS not outfitted with the MONSTER STRUCTURAL MODIFICATION KIT. (MONSTER Bulletins of January 18 and April 20, 1982.)

Inasmuch as operating stresses at critical locations are reduced by the addition of the MONSTER STRUCTURAL MODIFICATION KIT, those MONSTERS operating with the kit installed will not require the complete and detailed NDT inspection program to be performed annually.

This directive Bulletin is to be incorporated into all MONSTER documentation officially becoming part of the MONSTER Operation/Maintenance/Parts Manual/Catalog. This information to always accompany The MONSTER in the event of its transfer or sale. In the event of sale or transfer of a MONSTER, it is the responsibility of seller to inform buyer or future owner of this directive Bulletin so buyer or future owner may take appropriate action as outlined herein.

# 10 BULLETIN RECOMMENDING REPLACEMENT OF CERTAIN MONSTER PARTS

Eyerly Aircraft Company recommends the replacement of certain MONSTER with factory new replacement parts of a new and improved design. Users may directly contact the parts department, Eyerly Aircraft Company, (503) 399-7706 regarding arrangements for the purchase of these parts:

NEW PART NAME	NEW PART NO.	QUANTITY	REPLACES OLD PART	REPLACES OLD PART NO.
Mudsill Shock Pad	P-741	8	Rubber Shock Pad	P-450
Bushing, Hinge Pin	P-744	12	Pillow Block Bushing	O-151
Swivel Block Bushing Long	P-745	12	12 spacers, 24 snap rings	P-348, P-194,
			24 needle bearings	P-349
Swivel Block Bushing Short	P-746	12	24 Needle Bearings,	P-349
			24 Washers	P-208
Washer, swivel block	P-747	24	Large swivel block washer	P-351

The new mudsill shock pads are of a new design made from a different rubber compound. The new rubber shock pad is designed to be far more flexible than the existing one and to retain the flexibility even at lower temperatures. In the event of shock and impact loadings that might occur in the ride sometime during future operations, the new rubber shock pads will help minimize them and also minimize the resulting structural damage.

Two possible sources for such shock and impact loadings are (1) loose critical bolted flange joints or (2) excessive wear clearances in critical bushing locations. Also the increased flexibility of the new shock pad design gives them increased ability to absorb uneven ground displacements that might occur in the future, due to heaving and settling of the soil under some of the foot pads, without producing excessive pad loadings in adjacent pads.

The new sweep hinge pin bushings, swivel block bushings, and large swivel block washers are all manufactured from Nylatron (impregnated with molybdenum disulfide). Benefits of these bushings are threefold: (1) the Nylatron material with its greater flexibility and damping characteristics than the present brass bushing material, will have the tendency to attenuate shock and impact loads that otherwise would be fully transmitted through these critical joints, (2) somewhat more ability to tolerate missed lubrication periods will exist with the Nylatron bushings since they are compounded with molybdenum disulfide which serves as a self lubricant, (3) periodic maintenance replacement of these bushings in the future can be accomplished with much less labor due to the simplicity of the new design.

### 3.0 SPECIAL OPERATOR INSTRUCTIONS

1. Smooth, reduced acceleration on rotation start-up: control the acceleration on rotation start-up by taking at least 3/4 of a revolution to bring it up to speed.
2. Smooth, reduced acceleration on eccentric start-up: control the acceleration on eccentric start-up by taking at least 3/4 of a revolution to bring it up to speed.

3. Check the ride speeds at least once during each operating shift to insure that the ride is not operated at excessive speeds. The RPM's can be checked by timing the number of revolutions with the second hand on a wristwatch. The following RPM's should not be exceeded:

Rotation: 7 to 7-1/2 RPM's CCW

Eccentric: 10 to 10-1/2 RPM's CW

NOTE: Notify the maintenance supervisor if these RPM's are at any time observed to be exceeded, so that the necessary adjustments to the ride may be made.

4. Smooth, reduced deceleration on rotation stopping: control the deceleration on rotation stopping by taking at least 3/4 of a revolution to bring it to a stop.
5. Smooth, reduced deceleration on eccentric stopping: control the deceleration on eccentric stopping by taking at least 3/4 of a revolution to bring it to a stop.
6. Do not allow passenger overloading of cars - 400 lbs is the maximum per car.
7. Make every effort to load approximately equal passenger loadings in opposite cars to achieve well balanced loads.
8. Make every effort to load approximately equal passenger loadings in opposite sweeps to achieve well balance loads.

NOTE: Adherence to these instructions is important to avoid excessive ride loadings and to minimize fatigue damage in critical structural locations. The maximum rotation and eccentric RPM's of 8 RPM CCW and 11 RPM CW respectively given in the MONSTER OPERATING MANUAL are to be considered as MAXIMUM limits and are not to be considered as settings for continuous operation.

#### 4.0 RIGOROUS LUBRICATION PROGRAM ESSENTIAL

The importance of adhering to the required periodic lubrication program cannot be overstressed. Faithful diligence in following the lubrication chart and the recommended lubrication frequency is essential in avoiding premature wear of critical bushings and bearings. Such premature wear in critical bushings and bearings can create excessive clearances and be the cause for excessive shock and impact loadings seen by the ride during operation. This can result in premature fatigue damage to critical structural elements of the ride necessitating possible extensive mechanical repair.

Refer to the MONSTER OPERATING MANUAL and the LUBRICATION INSTRUCTIONS SHEET for details on lubrication requirements.

## 1.0 DAILY CHECKING OF RIDE SPEEDS

Rotation and eccentric RPM's are to be checked (1) each day before the days ride operations begin and (2) following the performance of maintenance work of any kind before the ride is returned back into service.

The ride should not be operated at RPM's in excess of the following:

ROTATION: 7 to 7-1/2 RPM's CCW Maximum

ECCENTRIC: 10 to 10-1/2 RPM's CW Maximum

The RPM's can be checked by timing the number of complete revolutions turned in a given period of time using a wristwatch.

The maintenance department must make suitable adjustments if required to insure that the above ride speeds are not exceeded.

The maximum rotation and eccentric RPM's of 8 RPM CCW and 11 RPM CW respectively given in the MONSTER OPERATING MANUAL are to be considered as MAXIMUM limits and are not to be considered as settings for continuous operation.

## 6.0 WEEKLY STRUCTURAL INSPECTIONS

On a weekly basis a very thorough visual inspection is to be made of all the critical structural locations as shown on enclosed drawing P-760. This visual inspection is to be made in sufficient detail to successfully identify if they are present, cracks as small as 1/8 inch in length.

In the event a suspected crack is found, the location should be given a thorough NDT inspection using the magnetic particle technique to clarify whether or not the indication is actually a flaw or crack that has the potential of growing in length under further operation of the ride. A significant crack is a crack determined to be 1/8 inch in length or greater. The ride can continue to be operated if isolated small cracks of less than 1/4 inch are present providing the location is closely monitored on a daily basis. However, the ride should not be operated with the cracks present that are 1/4 inch in length or greater until a suitable repair has been accomplished. Eyerly Aircraft Company recommends that MONSTERS with significant fatigue damage (i.e., fatigue cracks of 1/4 inch or greater in length) be (1) weld repaired in accordance with a factory established criteria and (2) properly reinforced with a MONSTER STRUCTURAL MODIFICATION KIT before the ride is returned to service.

As a further aid in insuring that inspection locations of importance are not missed, use the attached MONSTER INSPECTION CHECK LIST SHEET and the MONSTER OPERATING MANUAL.



## 7.0 WEEKLY INSPECTIONS OF STRUCTURALLY CRITICAL BOLTS AND BOLTED JOINTS

On a weekly basis, very thorough visual inspection is to be made of all the structurally critical bolts and bolted joints in locations as shown on attached drawing P-761. These are to be carefully examined for signs of (1) a loose joint with play in it, (2) loose bolts, or (3) excessively worn bolts.

Joints having bolts that are suspected of being loose should have bolt torque levels checked against the factory provided bolt torque criteria as given on drawing P-761. Bolts that are found to have become loose or bolts that have been found to have fallen in torque value below 50% of the factory recommended torque levels should be replaced with new bolts and nuts of the required size and grade using the bolt torque criteria provided. Tightening procedures should be done using a torque wrench. For the larger bolts, it may be advantageous to use a 600 ft. lb. capacity torque wrench together with a 4 to 1 multiplier.

The matter of tight bolted joints is very important and the ride must not be operated with loose bolted joints or with bolts that are loose or improperly torqued. Otherwise severe shock loadings caused by the play in loose joints can produce structural fatigue damage and structural cracking in the ride that can necessitate mechanical structural repair of the ride before it can be returned to service.

## 8.0 MONTHLY INSPECTIONS OF STRUCTURALLY CRITICAL BOLTS AND BOLTED JOINTS

On a monthly basis all bolts at structurally critical locations are to be actually checked for proper tightness and torque. Locations to be checked are as shown on drawing P-761. Bolt torque levels should be checked against the factory provided bolt torque criteria as given on drawing P-761. Bolts that are found to be torqued within 50% of the factory recommended torque levels can be torqued up to the recommended levels. Bolts that are found to have become loose or bolts that have been found to have fallen in torque value below 50% of the factory recommended torque levels should be replaced with new bolts and nuts of the required size and torqued to the factory recommended torque values. All tightening must be done using a torque wrench. For the larger bolts, it may be advantageous to use a 600 ft. lb. capacity torque wrench together with a 4 to 1 multiplier in the event a torque wrench is not available that has the full torque capacity required.

The matter of tight bolted joints is very important and the ride must not be operated with loose bolted joints or with bolts that are loose or improperly torqued. Otherwise severe shock loadings caused by the play in loose joints can produce structural fatigue damage and structural cracking in the ride that can necessitate the performance of suitable mechanical structural repair of the ride before it can be returned to service.

## 0 REGULAR MAJOR ANNUAL STRUCTURAL INSPECTIONS REQUIRED

Eyerly Aircraft Company recommends that on a regular basis a major structural inspection be performed. This is to be a very thorough inspection consisting of the following:

(1) Complete NDT inspection by magnetic particle of all the structurally critical areas and locations to be performed by qualified expert professionals in the NDT technique.

(2) Inspection of all critical bushings and bearings for excessive wear damage.

(3) Replacement of all structurally critical bolts and nuts with new ones of the required grade and size and torqued to the factory required torque levels.

The NDT inspection is to be performed by competent professionals in the magnetic particle technique. Magnetic particle inspection is to be made of the critical structural areas and locations as shown on drawing P-760. This inspection is to be made in such detail as to insure that cracks, flaws, or defects as small as 1/8 inch in length and 0.020 inches in depth will be detected. Small cracks that may be found are to be repaired providing they are less than 1/4 inch long and isolated from other similar cracks that might have been detected. Contact factory for recommended repair procedure for such cracks. The ride should not be operated with cracks present that are 1/4 inch or greater until a suitable repair has been accomplished. Eyerly Aircraft Company recommends that MONSTERS with significant fatigue damage (i.e., fatigue cracks of 1/4 inch or greater in length) be (1) weld repaired in accordance with a factory established criteria and (2) properly reinforced with a MONSTER STRUCTURAL MODIFICATION KIT\* before the ride is returned to service.

All structurally critical bushings and bearings must be inspected for condition and excessive wear clearance and replaced if required. For the sweep hinge pin bushings, the maximum diametral clearance allowed between pin and bushing diameters including wear is 0.012 inches using the bronze bushings and 0.018 inches using the Nylatron bushings. The preferred method for checking this clearance is by physical measurements of the sweep hinge pin and bushing diameters upon their disassembly. However, if their clearances are to be determined without removal of the bushings, the procedures outlined on enclosed drawings P-756 and P-757 (depending on whether Nylatron or bronze bushings) may be used. For the hinge column bushings, a maximum total diametral clearance of 0.035 inches is allowed. If the hinge column is to be removed from the cage, this

clearance may be determined using the procedure given on enclosed drawing P-758. If the hinge column is not to be removed from the page, this clearance may be determined using the alternate procedure given on enclosed drawing P-755. Allowable wear on the hinge column thrust ring is established from the criteria given on enclosed drawing P-759. For the car spindle bushings, a maximum diametral clearance between car spindle and car spindle bushing of 0.010 inches is allowed considering the effects of wear. Check all bearings and rotating hubs for play and rough bearing. Repair/replace as required. Owner is cautioned to completely and fully lubricate prior to leaving the MONSTER idle for an extended period (such as for example, over the winter months until the next operating season) to avoid corrosion damage to critical bearings.

As part of the annual inspection, all structurally critical bolts and nuts must be replaced with new ones of the required grade and size and torqued to the factory required levels as given on drawing P-761. All tightening must be done using a torque wrench. For the larger bolts it may be advantageous to use a 600 ft. lb. capacity torque wrench together with a 4 to 1 multiplier in the event a torque wrench is not available that has the full torque capacity required. Care is to be exercised to insure that the interfaces between bolted flanges and bolted joints are free from grease and oil before they are bolted together. This will minimize the possibility of play or slippage of the properly torqued joint. Following bolt assembly, exposed bolt threads are to be left coated with a thin film of grease or corrosion preventative.

All pins and holes in pinned joints/connections are to be inspected for wear, hole enlargement, and cracks. Replace/repair as required if connection is excessively loose.

Extreme care must be exercised to insure that the support rods are straight, of equal length adjustment, and are evenly carrying the sweep loads following major inspection activity prior to returning the ride to service. Inspection of the support rod assembly is to be performed per attached drawing P-754/sheet 20 of 24. Support rod length adjustments that may be required are to be performed per the instructions given on drawing P-751.

As an aid in insuring that important inspection locations are not missed, use the attached MONSTER INSPECTION CHECK LIST SHEET and the MONSTER OPERATIONS MANUAL.

\*FOOTNOTE: Described in MONSTERS BULLETINS of Jan. 13 & April 20, 1982.

## 10.0 SPECIAL STRUCTURAL INSPECTIONS REQUIRED FOLLOWING OCCURENCE OF AN INCIDENT.

A special structural inspection is to be performed immediately following occurrence of an incident before the ride is returned back into service. In the context here, an incident is defined as any extraordinary event that has the potential of producing extraordinary loadings of any kind (including impact or shock loadings) that could adversely affect the structural integrity or safety of the ride. A few examples of incidents requiring special structural inspections are:

- (1) Structurally critical bolted joints found to be loose allowing play or movement during operation.
- (2) Critical bushings or bearings found to have developed excessive clearance and play.
- (3) Discovery that the ride has operated significantly over the recommended RPM's.
- (4) Discovery that the ride has operated with significant passenger overloading.
- (5) Discovery that the ride has operated with excessively imbalanced passenger loads.
- (6) Discovery that the ride has been subjected to excessive starting or stopping loads.

In the event of the occurrence of such an incident, the special structural inspection required to be performed consists of essentially the same tasks as the regular major annual structural inspections required as described in Section 9.0 of this Bulletin. The areas to be inspected and the level of detail of the inspection to be governed by the exact nature of the incident however.

MANUFACTURERS OF AMUSEMENT RIDES



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1892 - 1963

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CHAIRMAN OF BOARD

JON V. EYERLY  
PRESIDENT

APPDENIX FOR MONSTER BULLETIN

APPENDIX FOR  
INSPECTION, OPERATION, AND MAINTENANCE BULLETIN FOR  
MONSTERS NOT OUTFITTED WITH THE STRUCTURAL REINFOR-  
CEMENT KIT.

SEPTEMBER 27, 1982

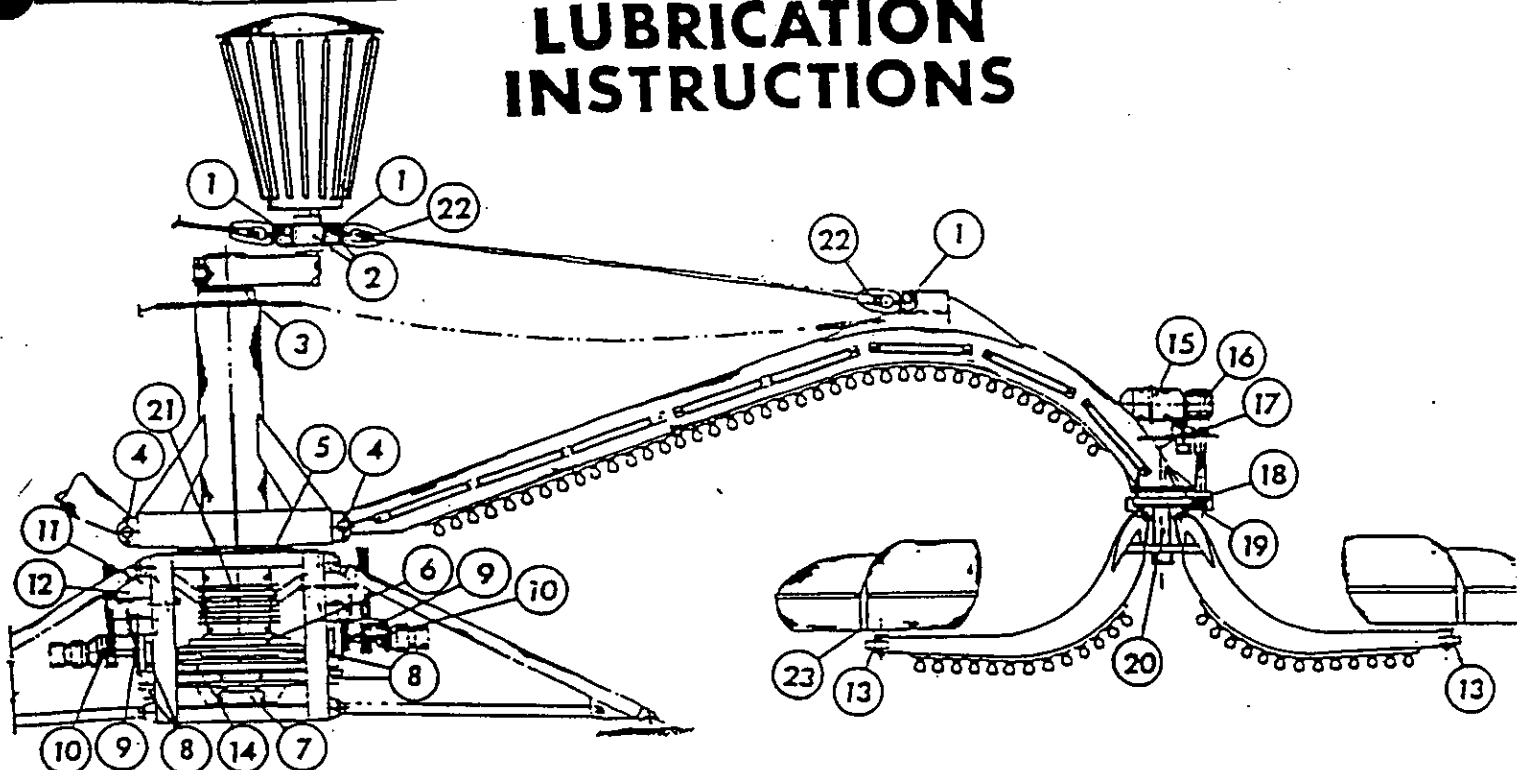
APPENDIX FOR MONSTER BULLETIN

CONTENTS OF APPENDIX

<u>DESCRIPTION/TITLE</u>	<u>DWG/REF NO.</u>
LUBRICATION INSTRUCTIONS	----
THE MONSTER INSPECTION CHECK LIST	----
CRITICAL STRUCTURAL LOCATIONS FOR INSPECTION	P-760
STRUCTURALLY CRITICAL BOLT LOCATIONS AND TORQUE REQUIREMENTS	P-761
CHECKING THE SWEEP HINGE PIN BUSHINGS (BRONZE)	P-756
CHECKING THE SWEEP HINGE PIN BUSHINGS (NYLATRON)	P-757
HINGE COLUMN BUSHING CLEARANCE (WITH COMPLETE TEAR DOWN)	P-758
HINGE COLUMN BUSHING CLEARANCE CHECKING PROCEDURE (WITHOUT TEAR DOWN)	P-755
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INSPECTION AND REPAIR CRITERIA. SUPPORT ROD (SHEET 20 OF 24 ONLY)	P-754
SUPPORT ROD LENGTH ADJUSTMENT	P-751



# LUBRICATION INSTRUCTIONS



LUBRICATION INTERVAL: THE ABOVE TABLE OF LUBRICATION INTERVALS REFER TO AVERAGE OPERATING CONDITIONS WITH GREASE SEALS INTACT.

NO.	DESCRIPTION OF PART	BEARING TYPE	
1	SWIVEL BLOCKS	ANTI-FRICTION	(A)
2	ECCENTRIC HUB	ANTI-FRICTION	(B)
3	ECCENTRIC TUBE UPPER BEARING	ANTI-FRICTION	(B)
4	HINGE PIN BUSHING	BRONZE	(A)
5	HINGE COLUMN UPPER BUSHING	BRONZE	(A)
6	HINGE COLUMN LOWER BUSHING	BRONZE	(A)
7	ECCENTRIC TUBE LOWER BEARING	ANTI-FRICTION	(B)
8	DRIVE SHAFT BEARINGS	ANTI-FRICTION	(C)
9	HYDRAULIC DRIVE INNER BEARING	ANTI-FRICTION	(C)
10	HYDRAULIC DRIVE OUTER BEARING	ANTI-FRICTION	(B)

NO.	DESCRIPTION OF PART	BEARING TYPE
11	GEAR CASE UPPER BEARING	ANTI-FRICTION
12	GEAR CASE	ANTI-FRICTION
13	CAR SPINDLE BUSHINGS	NYLON OR BRONZE
14	MAIN DRIVE CHAINS	
15	HYDRO SHEAVE	
16	SPIDER MOTOR GEAR BOX	ANTI-FRICTION
17	DRIVE SHAFT UPPER BEARING	ANTI-FRICTION
18	DRIVE SHAFT LOWER BEARING	ANTI-FRICTION
19	SPIDER DRIVE CHAINS	
20	SPIDER HUB ASSEMBLY	ANTI-FRICTION

(A) DAILY OR EVERY EIGHT HOURS DURING HEAVY OPERATIONS.

(B) LIGHTLY EVERY TWO WEEKS.

(C) EVERY THREE MONTHS.

(D) CHECK EVERY MONTH, CHANGE EVERY YEAR. USE E. P. 90

(E) KEEP ALL MOVING PARTS OF THE CARS AND SUPPORT RODS OILED DAILY.

(F) CHANGE OIL IN HYDRO-SHEAVE EVERY 4000 HOURS OR ONCE A YEAR. USE 10W ABOVE 10 DEGREE F. & 5W BELOW 10 DEGREE F. OIL IS TO BE HEAVY DUTY TO MEET A. P. I. SPECIFICATIONS CLASS M. S.

(G) LUBRICATE DRIVE CHAINS EVERY TWO WEEKS WITH AN APPROVED LUBRICANT SUCH AS CHEVRON PINION GREASE, ROTANIUM POWER-LUBE NO. 91665 OR EQUIVALENT.

(H) USE A COMPOUNDED GEAR LUBE WITH AN E. P. ADDITIVE COMPLY WITH AGMA-7 E. P. OR AGMA-8 E. P. SPECIFICATIONS.

## NOTES:

USE A MULTI-PURPOSE WATER RESISTANT GREASE WITH ACCEPTED EXTREME PRESSURE ADDITIVE SUCH AS CHEVRON R. P. M. MOLYGREASE NO. 1 OR MOBIL GREASE SPECIAL II PRESSURE FITTINGS.

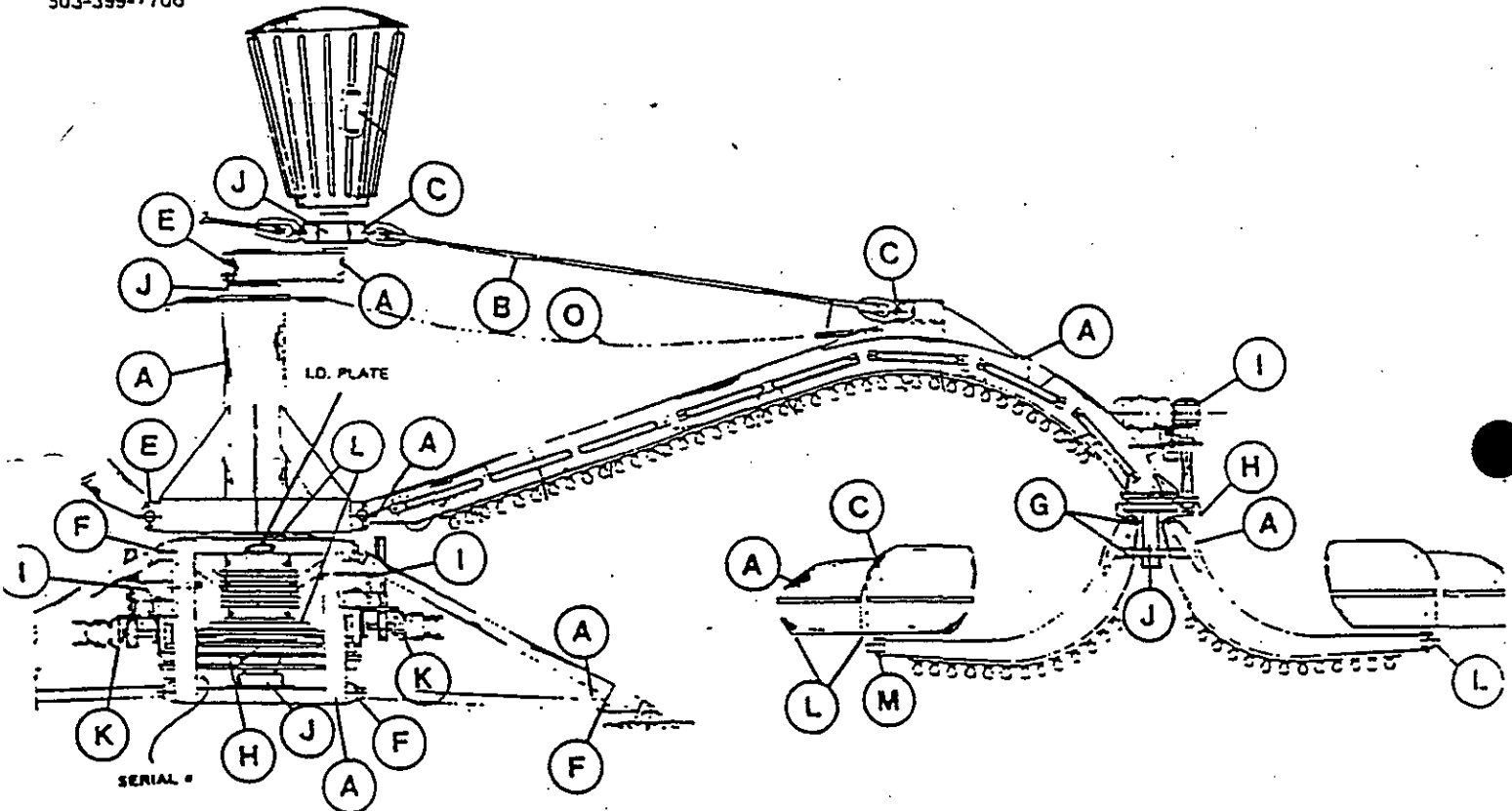
KEEP LIGHT RINGS CLEAN AND FREE OF CONTAMINANTS AS GREASE, OIL ETC.





## THE MONSTER INSPECTION CHECK LIST

SALES & SERVICE  
Toll Free outside Oregon  
(800) 547-9156  
Eyerly Inc.  
P.O. Box 12155  
2050 Turner Rd. S.E.  
Salem, Oregon 97309  
503-399-7706



- A. Inspect for weld cracks and structural damage
- B. Check support rods for equal tension. If bent replace. Inspect threads for cracks, check thrust washer for wear.
- C. Inspect swivel block needle bearings yearly, check for worn thrust washers, check attaching pin and nuts for tightness. Check for proper lubrication.
- D. Check safety cable for condition, broken strand, corrosion and adjustments. Cable should not bear weight of sweep when extended. Attaching points should move freely. Cable should be replaced if sweep is dropped.
- E. Check bolts for condition and correct tightness. Bolt should be replaced if torqued to max. after removal. Inspect condition of pillow block - hinge pin, if damaged or loose - replace.
- F. Check condition of attaching pins & fastener. Pin should be cotter keyed and not hair pinned. Inspect for hole enlargement and repair if needed.
- G. Inspect for loose bolts. If bolts are torqued to max. Bolt should be replaced after removal. Inspect safety pin for fastener. Fastener may be hair pin or cotter key.
- H. Check for loose or worn chain; repair or replace. Make sure chain does not rub guards, adj. as needed. Check all sprocket fasteners or securing members.

- I. Check oil level in gear housing. change yearly. Inspect oil level of fluid clutch and torque arm snubber in spider gear drive.
- J. Check all rotating hubs for play and rough bearing. Repair as necessary.
- K. Check all hyd. attaching pins & bolt for wear or looseness. Replace or tighten as needed. Inspect drive belts for wear, cracks or looseness. Repair as necessary.
- L. Check for wear in bushings, joints, hinges and linkage.
- M. Inspect spindle for wear and fastener for condition.
- N. General Information:

400 lbs. per car.  
Rotation 8 RPM ccw  
Spiders 15 RPM cw

Eccentric 11 RPM cw

Do not operate over 50% of recommended RPM in reverse.  
Note: (1) The monster requires a routine checking for loosening bolts. We recommend every 30 days of operation.

(2) Many causes of mechanical repair have resulted from failure to follow the recommended lubrication frequency failure to follow the lubrication chart. We cannot over-emphasize the importance of following the factory lubrication instructions.

MANUFACTURERS OF AMUSEMENT RIDES

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LEE U. EYERLY  
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JACK V. EYERLY  
PRESIDENT

P. O. Box 12441

SALEM, OREGON 97309

June 12, 1981

TO ALL MONSTER OWNERS:

It has been brought to our attention that structural cracks have been found in our MONSTER device in the following areas:

- (1) Stub arm (P-284) attaching points.
- (2) Sweep swivel block attaching plates - outer ends.
- (3) Outer end of sweep hinge pin reinforcement gusset under 3-lamp stringer.
- (4) Sweep hinge spindle.
- (5) Hinge plane vertical gusset at attaching point to outer column.
- (6) Mudsill tie rod attaching point at cage bottom.
- (7) Lower cage corner weldmount at cage bottom.
- (8) Cage corner attaching points for lower column support (P-261).
- (9) 360 degree horizontal weld around outer column reinforcement band.

These areas and all other areas of high tensile stress should be inspected immediately by a competent professional engineer. The presence of fatigue defects may not be discernible through simple visual inspection and the inspection must be conducted by a competent professional who is qualified to determine and carry out the necessary inspection and testing techniques that may be required in any given instance. Please report findings to Eyerly Aircraft Co. as soon as possible.

As with all structures which are subjected to stress, the MONSTER device has a finite fatigue life and fatigue defects may develop in comparatively new machines that are subjected to intensive usage over a relatively short period of time. Therefore, the chronological age of the machine is not a satisfactory guideline for determining whether or when to inspect for fatigue defects. Also, improper operation and improper maintenance may shorten the fatigue life of the device. Accordingly, a program of periodic inspection for fatigue should be established and carried out throughout the operating life of each device.

RECEIVED

FEB 27 1989

EYERLY AIRCRAFT COMPANY  
P. O. Box 12155  
Salem, OR 97309

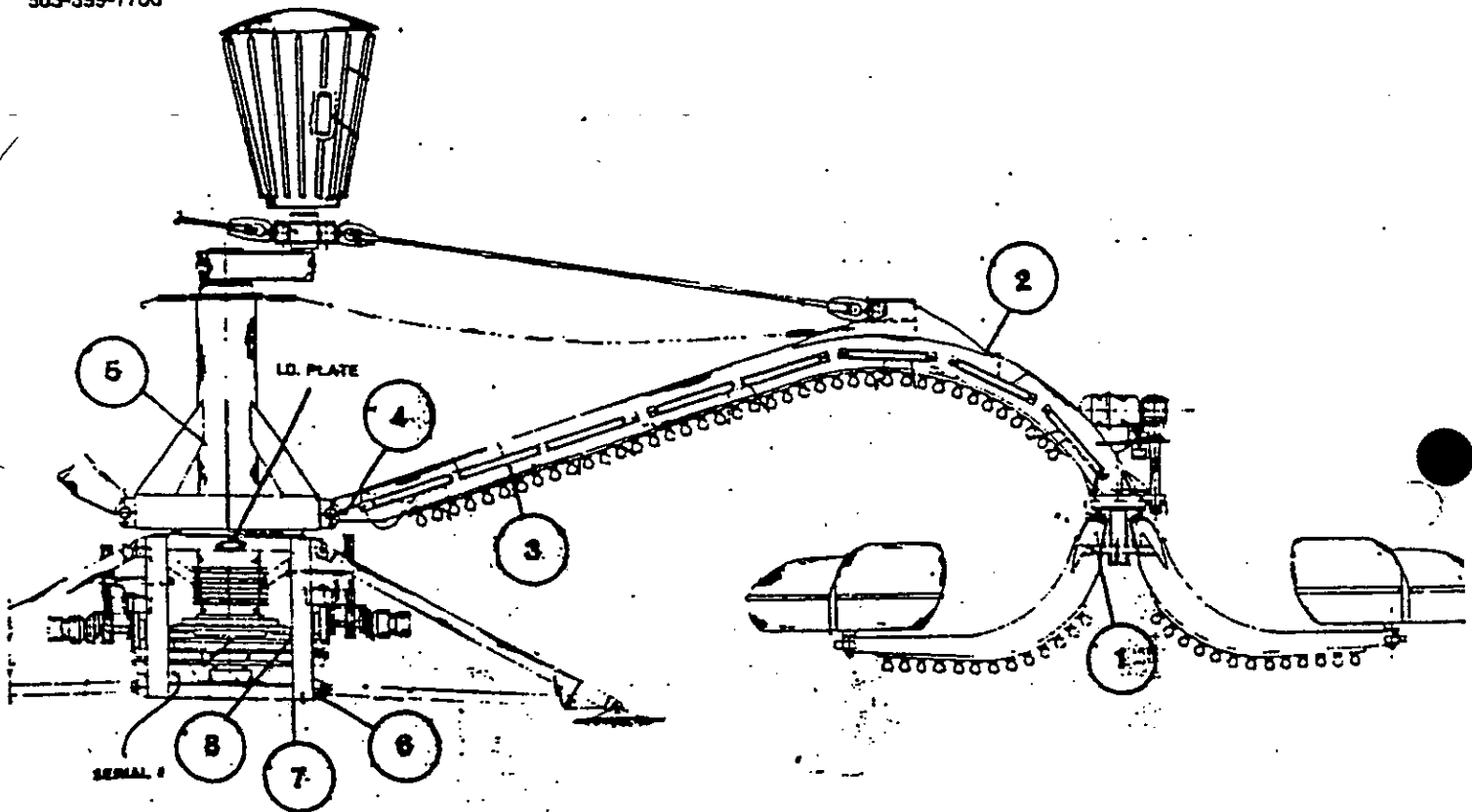
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DEPARTMENT OF LABOR  
CARNIVAL & AMUSEMENT RIDE  
INSPECTION DIVISION



## THE MONSTER

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MANUFACTURERS OF AMUSEMENT RIDES



LEE U. EYERLY  
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JACK V. EYERLY  
PRESIDENT

P. O. Box 12155  
SALEM, OREGON 97309

January 18, 1982

TO: ALL MONSTER OWNERS

Subject: Recommended repair/modification of MONSTERS with structural fatigue cracks.

Reference: Eyerly letter of June 12, 1981, reminding recommended inspection of MONSTER rides.

#### CAUSES OF STRUCTURAL CRACKING PROBLEM

We have completed our review and evaluation of the MONSTER structural crack inspection reports that we have received from MONSTER owners. We have also conducted analysis here at the factory on the structural cracks found in a MONSTER ride that has been in service a number of years. Additionally we have correlated the cracking problem with a number of maintenance/operation related problems that have come to our attention over the years. As a result of this analysis we have determined the cause of the structural fatigue damage (cracking) found in a number of the MONSTER rides to be combinations of the following factors:

- (1) Operation with excessive loads, combined with poor maintenance such as excessive play in critical joints due to loose bolts, excessive wear clearances allowed to develop in critical bushings, uneven footing support elevations.
- (2) Corrosion fatigue effects occurring as a result of corrosion allowed to occur with the passage of time in relatively highly stressed regions of key structural elements of the ride.
- (3) Operation with excessive loads combined with shock and vibration resulting from imbalanced passenger loadings which constitutes improper use of the ride.
- (4) Operation with excessive loads and operating the ride at excessive speeds.

It has been determined that the fatigue damage has not been caused by the MONSTER ride design or the materials or fabrication procedures used in its construction. It has also been determined that the extent of fatigue damage does not correlate with age or date of manufacture - chronological age alone is not an appropriate guide to the expected degree of fatigue damage.

#### RECOMMENDATIONS TO EXTEND USEFUL LIFE OF FATIGUE DAMAGED MONSTERS

A number of owners with structurally cracked MONSTERS have requested from us recommendations on repairs and modifications that could be expected to increase their safety and life. The engineering department at Eyerly Aircraft Company has addressed this question and outlined a conservative strategy of repairs and structural reinforcements (that can be incorporated in the field) designed to meet these objectives. We are presently preparing detailed drawings and

specifications required to derive the resulting structural modification kit for field installation. Some important benefits of incorporating the recommended modifications are: (1) the increased ability of the MONSTER to tolerate future maintenance/operation problems (this benefits presently undamaged MONSTERS also), (2) the modifications reduce stresses in important partially fatigue damaged locations thereby extending the useful fatigue life. As a conservative approach, Eyerly Aircraft Company recommends installation of the structural modification kit on all MONSTER rides even those showing no apparent signs of fatigue damage or structural cracking. Detailed instructions and specifications outlining the field installation of the kit elements will be included with the kit as will be the ribs, gussets, reinforcements, bushings, bearings, pads, etc., that are required to be installed.

#### MODIFICATION ACTIVITIES TO BE CONDUCTED BY MONSTER OWNERS

Repair of fatigue damaged MONSTERS and installation of the structural modification kit is not a small job and will take some time, however, the job can be performed in the field by competent personnel. Included in the activities to be performed by the owners are:

- (1) Fairly complete disassembly including removal of cross arms and sweeps and disassembly of cage (removal of center hinge column).
- (2) Cleaning/sandblasting of at least the critical areas and removal of corrosion.
- (3) Visual and magnetic particle inspection (and if/as required select ultrasonic inspection to be performed by competent professionals to full define significant cracks in structurally critical areas.
- (4) Carbon arc/air (air/arc) removal of cracks and weld repair of structurally critical cracks by a competent certified welder.
- (5) Fitting and welding of the new structural modification kit structural elements to the existing MONSTER structure to be performed by a competent certified welder.
- (6) Reinspection including Non Destructive Testing of repaired and new weld areas.
- (7) Repaint at least the structurally critical areas with a suitable corrosion prevention primer and paint system.
- (8) Reassembly and checkout of the MONSTER ride. Important structural parts found to be excessively damaged should be replaced with factory new replacement parts.

#### EXPECTED SCHEDULING FOR MODIFICATION KIT AVAILABILITY

Immediately following completion of our modification kit engineering/design work, we plan to install a prototype structural modification kit on a MONSTER here at the factory and subject it to test. Upon completion of this, we plan to offer the complete structural modification kit including instructions, specifications, drawings, and kit parts to be installed. It is presently estimated that the modification kit will be available on March 19, 1982. Inasmuch as we have not yet completed the engineering for the kits, we have not had the opportunity to engage in their costing. As soon as costing is determined all MONSTER owners will be advised and orders accepted for a production run of the required materials.

EYERLY AIRCRAFT COMPANY

INSPECTION AND REPAIR CRITERIA AND INSTRUCTIONS  
(IN PREPARATION FOR INSTALLATION OF MONSTER MODIFICATION KIT)

PREPARED FOR  
MONSTER OWNERS ENGAGED IN PREPARATIONS  
FOR INSTALLING THE MONSTER MODIFICATION KIT

PREPARED BY  
EYERLY AIRCRAFT COMPANY  
P O BOX 12155  
SALEM, OREGON 97309  
(503) 399-7706

MAY 14, 1982

INSPECTION AND REPAIR CRITERIA

DRAWN BY: S.M.	SCALE: —	NO. REQ'D.: —	MATERIAL: —
DATE: MAY 14 1982	NEXT ASSY.: —	SOS. NO.: —	



Org. No. P-754

INSPECTION AND REPAIR CRITERIA AND INSTRUCTIONS  
(IN PREPARATION FOR INSTALLATION OF MONSTER MODIFICATION KIT)

TABLE OF CONTENTS

Section	Sheets	Section Title
I	3-4	Cage-Inspection and repair criteria and instructions.
II	5-8	Hinge Column - Inspection and repair criteria and instructions.
III	9-14	Sweep - Inspection and repair criteria and instructions.
IV	15	Hinge Column Support Thrust Ring - inspection and replacement criteria and instructions.
V	16-19	Hinge Column Support Bushings - Inspection and replacement criteria and instructions.
VI	20	Support Rod Assembly - Inspection and replacement criteria and instructions.
VII	21-22	Mud Sill Structural Elements - Inspection and repair criteria and instructions.
VIII	23	Stub Arms - Inspection and repair criteria and instructions.
IX	24	Other Structural Elements

INSPECTION AND REPAIR CRITERIA

OWN BY:	SCALE:	NO REQ'D:	MATERIAL:
S.M.			
DATE:	NEXT ASSY:	SDS. NO.:	
3 MAY 82		SDS. BY NO.:	



Org. No. P-754

## SECTION I

### CAGE - INSPECTION AND REPAIR CRITERIA AND INSTRUCTIONS

#### A. Definition of repairable defects

The extent of the structural reinforcement to the cage added by the kit is sufficiently large so as to insure that virtually any amount of cage fatigue damage or any degree of structural cracking that has occurred can be repaired. The judgement that all cages are repairable regardless of the present state of their damage assumes (1) that the modification kit will be subsequently installed following repair prior to the return of the ride into service and (2) that all significant damage is repaired and (3) that the inspection and repair will be made in accordance with the instructions outlined in this section.

#### B. Repairable cracks/defects criteria

##### (1) Weld joints between structural elements:

Any crack size occurring in any of the weld joints between structural elements/members is considered repairable.

##### (2) Lower mudsill attachment point clevis members:

Cracks up to 1/2 inch long in the female clevis members themselves occurring in the vicinity of the attachment pins are considered repairable.

##### (3) Other structural members:

In the remainder of the cage structural members, any size crack is considered repairable.

#### C. Cage inspection criteria/instructions.

(1) Remove paint and corrosion from at least the critical areas to be inspected by cleaning, sandblasting or other appropriate means.

(2) All inspection work to be conducted by competent professionals in NDT inspection technique.

(3) All weld joints are to be fully inspected by the magnetic particle technique.

(4) All structural members are to be fully inspected by the dye penetrant or magnetic particle inspection technique plus very careful visual inspection.

(5) Crack locations and extent must be appropriately identified and marked so that repair can be successfully performed.

### INSPECTION AND REPAIR CRITERIA

OWN BY:	SCALE:	NO. REQ'D:	MATERIAL:
M.			
DATE:	NEXT ASSY.:	SDE. NO.:	
12 MAY 87			



Org. No. P-754



(6) Cracks found to be of an extent beyond the repairable crack criteria should be discussed with the factory to establish a suitable repair action.

Cage repair criteria/instructions.

(1) Cracks or other significant flaws or defects that have been detected, identified and marked are to be completely removed to their full extent by the carbon arc/air (air/arc) technique or suitable equivalent by a competent certified welder.

(2) Very high quality weld repair using gas metal arc welding (GMAW) and low hydrogen technique with suitable gas shielding is to be performed by a competent certified welder. AWS E70S-3 or AWS E70S-6 wire would be suitable selections for the weld repair work on the basically all mild steel cage. Wire size selections should be appropriate for the size of each weld repair. Suitable multipass and interpass cleaning technique to be used as required.

(3) Following the weld repair, the repaired areas should be reinspected to insure soundness.

INSPECTION AND REPAIR CRITERIA

DRAWN BY: S.M. SCALE: NO. REQ'D.: MATERIAL:

DATE: 13 MAY 33 NEXT ASSY.: SDS NO.: SDD BY NO.:



Org. No. P-754

## SECTION II

### HINGE COLUMN INSPECTION AND REPAIR CRITERIA AND INSTRUCTIONS

#### A. Definition of repairable defects.

Any size crack or defect occurring in only weld metal is considered to be repairable providing it occurs only in the weld metal and does not penetrate into the wall thickness of the parent metal.

Cracks initiating in weld metal and penetrating into the wall of parent metal must be evaluated based on criteria for cracks/defects in parent material.

Cracks or defects occurring in or penetrating into the wall thickness of the parent metal are considered repairable so long as their extent is found to fall within the established criteria for repairable crack size and orientation. The criteria establishing allowable crack/defect sizes that are considered repairable varies significantly depending on the location of the flaw and its orientation. Cracks that are found to exceed our criteria for repairability should be discussed with the factory to establish whether or not the component is repairable or must be replaced with a factory new part.

The repair criteria to be used assumes that, following repair, the modification kit will be added before the ride is placed back in operation.

#### B. Repairable cracks/defects criteria. (SEE ILLUSTRATION SHT 8)

(1) Hinge plane vertical gusset at attaching point to outer column.

A 2-1/2 inch long crack anywhere in this gusset is considered repairable no matter the orientation.

(2) Hinge column wall at intersection of hinge plane vertical gusset.

Weld repair in the wall of the 0.938 inch thick A53 pipe in this location is repairable providing it meets the following maximum length/orientation criteria:

1-1/2 inches long maximum if crack runs circumferentially.

2 inches maximum if crack is within  $\pm 45^\circ$  of longitudinal.

2-1/2 inches maximum if crack is within  $\pm 10^\circ$  of longitudinal.

(3) Hinge column wall at 360 degree horizontal weld around outer column reinforcement band.

Weld repair is allowed at this location providing the crack length has not exceeded 3 inches in any orientation.

### INSPECTION AND REPAIR CRITERIA

DRAWN BY: S.M.	SCALE: —	NO. REQ'D.: —	MATERIAL: —
DATE: JUL 1 1982	NEXT ASBY.: —	SOS NO.: —	—



Dwg. No. P-754

(4) Wall in outer column reinforcement band.

Repair in the 1/2 inch thick wall of the outer column reinforcement itself is allowed for virtually any length crack providing it does not penetrate into the wall of the hinge column.

(5) Hinge column wall in lower section below the 360 degree horizontal weld around outer column reinforcement band.

Weld repair is allowed in the lower region providing the crack length has not exceeded 2 inches in any orientation.

(6) Hinge column wall in upper section well above the intersection of hinge plane vertical gusset

Weld repair is allowed in the upper region providing the crack length has not exceeded 1-1/2 inches in any orientation.

(7) Pillow block mounting welds.

Cracks found on exterior surface of these welds should be discussed with factory for repair instructions.

(8) Welds between members.

Cracks of any size are considered repairable in the welded joints between members providing the cracks do not penetrate into the parent metal.

(9) Other column structural members

Cracks in members not specifically covered by crack repair criteria in the above sub paragraphs are considered to be repairable to virtually any crack length.

C. Hinge column inspection criteria/instructions.

(1) Remove paint and corrosion from at least the critical areas to be inspected by cleaning, sandblasting or other appropriate means.

(2) All inspection work to be conducted by competent professionals in NDT inspection technique.

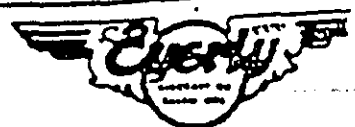
(3) All weld joints are to be fully inspected by the magnetic particle technique.

(4) All structural members are to be fully inspected by the dye penetrant or magnetic particle inspection technique plus very careful visual inspection.

(5) Crack locations and extent must be appropriately identified and marked so that repair can be successfully performed.

## INSPECTION AND REPAIR CRITERIA

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(6) Cracks found to be of an extent beyond the repairable crack  
Criteria should be discussed with the factory to establish a suitable  
action.

Hinge column repair criteria/instructions.

(1) Cracks or other significant flaws or defects that have been  
detected, identified and marked are to be completely removed to their  
full extent by the carbon arc/air (air/arc) technique or suitable equiv-  
alent by a competent certified welder.

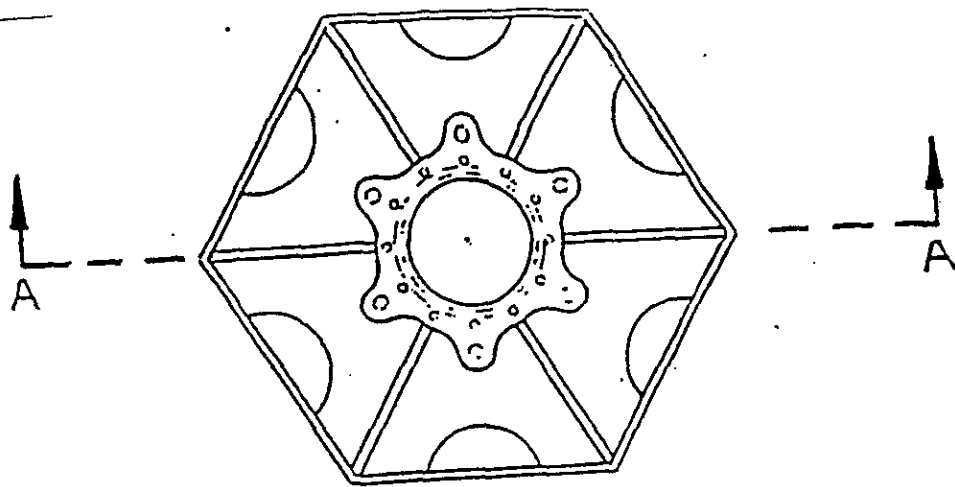
(2) Very high quality weld repair using gas metal arc welding (GMAW)  
and low hydrogen technique with suitable gas shielding is to be per-  
formed by a competent certified welder. AWS E70S-3 or AWS E70S-6 wire  
could be suitable selections for the weld repair work on the basically  
mild steel column. Wire size selections should be appropriate for the  
size of each weld repair. Suitable multipass weld technique and inter-  
pass cleaning technique to be used as required.

(3) Following the weld repair, the repaired areas should be reinspected  
to insure soundness.

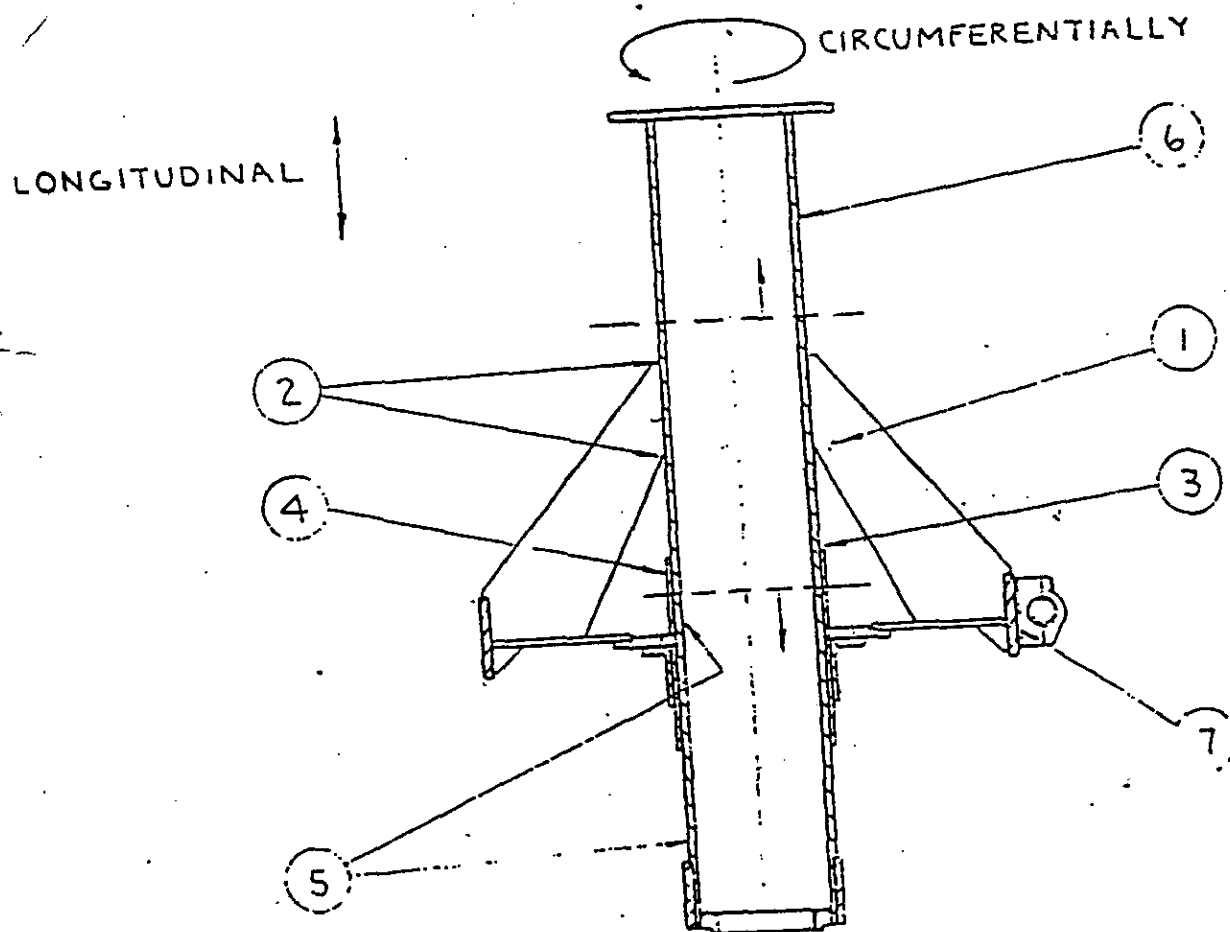
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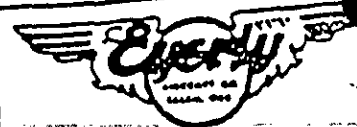
PLAN VIEW



SECTION A-A

HINGE COLUMN INSPECTION AND REPAIR

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### SECTION III

## SWEEP-INSPECTION AND REPAIR CRITERIA AND INSTRUCTIONS

### Definition of repairable defects.

Any size crack or defect occurring in only weld metal is considered to be repairable providing it occurs only in the weld metal and does not penetrate into the wall thickness of the parent metal.

Cracks initiating in weld metal and penetrating into the wall of parent metal must be evaluated based on criteria for cracks/defects in parent material.

Cracks or defects occurring in or penetrating into the wall thickness of the parent metal are considered repairable so long as their extent is found to fall within the established criteria for repairable crack size and orientation. The criteria establishing allowable crack/defect sizes that are considered repairable varies significantly depending on the location of the flaw and its orientation. Cracks that are found to exceed our criteria for repairability should be discussed with the factory to establish whether or not the component is repairable or must be replaced with a factory new part.

The repair criteria to be used assumes that, following repair, the modification kit will be added before the ride is placed back in operation.

Repairable cracks/defects criteria. (SEE ILLUSTRATION SHEET 14)

#### (1) Spindle

Cracks or defects occurring or extending into the spindle are considered repairable only under certain limited circumstances. No cracks or significant defects are allowed in the 3 inch diameter region of the spindle or in the 3-1/2 inch diameter region within 1/2 inch of the machined shoulder at each end of the spindle. Cracks in the spindle are considered repairable only if they occur in the 3-1/2 inch diameter region of the spindle providing they are located and extend no closer than 1/2 inch to the shoulder on the 3 inch diameter region. In this repairable region of the spindle a crack as large as 1/4 inch deep and 1/2 inch long is considered repairable. Spindles that fail to meet this criteria or that are excessively worn (pin diameter less than 2.988 inches) should be replaced. Spindle replacement is not normally considered to be a field replacement therefore the factory should be contacted if spindle replacement is indicated.

#### (2) Long Gusset to Spindle weld.

Repair is ok for any length crack occurring in this weld providing (1) it does not progress into the wall of the sweep arm and (2) it does not turn and penetrate into the spindle. Cracks penetrating into the spindle itself must be evaluated on criteria for the spindle. Cracks penetrating into the wall of the sweep arm itself must be evaluated on criteria for the sweep arm.

### INSPECTION AND REPAIR CRITERIA

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(3) Sweep arm to spindle weld.

Repair is ok for any length crack occurring in this weld providing it does not turn and progress into the spindle. Cracks penetrating into the spindle itself must be evaluated on criteria for the spindle.

(4) Long gusset to sweep arm weld.

Repair is ok for any length crack occurring in this weld providing it does not turn and progress into the wall of the sweep arm itself. Cracks penetrating into the wall of the sweep arm itself must be evaluated on the criteria established for the sweep arm.

(5) Long side gusset.

Repair is ok for any length crack occurring anywhere in the long side gussets providing they do not progress and penetrate into parent metal of adjoining structural elements. Cracks penetrating into adjoining structural elements must be evaluated based on criteria established for those elements.

(6) Sweep arm at outer tip of long gusset.

Crack repair is allowed on this small region providing they are within the following length/orientation criteria:

3/8 inch maximum if crack runs circumferentially.

5/8 inch maximum if crack runs within  $\pm 45^\circ$  of longitudinal.

7/8 inch maximum if crack runs within  $\pm 10^\circ$  of longitudinal.

(7) Sweep arm at base end inboard of outer tip of long gusset.

Crack repair in the wall of the sweep arm (0.365 inch wall A53 Pipe) is allowed in this section providing the cracks are within the following length/orientation criteria:

1/2 inch maximum if crack runs circumferentially.

3/4 inch maximum if crack is within  $\pm 45^\circ$  of longitudinal


1 inch maximum if crack is within  $\pm 10^\circ$  of longitudinal

(8) Sweep arm near spindle and base termination plates.

Crack repair in the wall of the sweep arm (0.365 inch wall A53 Pipe) is allowed in this region providing the cracks do not extend and penetrate into the spindle itself. Cracks penetrating into the spindle itself must be evaluated on criteria for the spindle. Cracks are allowed in the sweep area in the vicinity of the spindle and base termination plates providing the cracks do not exceed 1 inch in any orientation.

(9) Sweep arm between base termination plates and tip of long gusset (but removed from concentration points at tip of long gusset).

Crack repair on the wall of the sweep arm (0.365 inch wall A53 pipe) is allowed in this section providing the cracks are within the following

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length/orientation criteria:

- 5/8 inch maximum if crack runs circumferentially.
- 1 inch maximum if crack is within  $\pm 45^\circ$  of longitudinal.
- 1-1/2 inch maximum if crack is within  $\pm 10^\circ$  of longitudinal.

(10) Sweep arm in midsection at inner tip of tapered sweep support plate.

Crack repair is allowed in this small region in the wall of the sweep arm (0.365 inch wall A53 pipe) providing they are within the following criteria:

- 1/2 inch maximum if crack runs circumferentially
- 7/8 inch maximum if crack runs within  $\pm 45^\circ$  of longitudinal.
- 1-1/4 inch maximum if crack runs within  $\pm 10^\circ$  of longitudinal.

(11) Sweep arm between long gusset and sweep support plate (but removed from stress concentration points at tips).

Crack repair in the wall of the sweep arm (0.365 inch wall A53 pipe) is allowed in this section providing the cracks are within the following length/orientation criteria:

- 5/8 inch maximum if crack runs circumferentially.
- 1 inch maximum if crack runs within  $\pm 45^\circ$  of longitudinal.
- 1-1/2 inch maximum if crack runs within  $\pm 10^\circ$  of longitudinal.

(12) Sweep arm at outer tip of tapered sweep support plate.

Crack repair is allowed in this small region in the wall of the sweep arm (0.365 inch wall A53 pipe) providing they are within the following criteria:

- 3/8 inch maximum if crack runs circumferentially.
- 5/8 inch maximum if crack runs within  $\pm 45^\circ$  of longitudinal.
- 1 inch maximum if crack runs within  $\pm 10^\circ$  of longitudinal.

(13) Sweep arm in midsection in vicinity of sweep support plate in zone contained between tips of sweep support plate (but removed from stress concentration points at tips).

Crack repair in the wall of the sweep arm (0.365 inch wall A53 Pipe) is allowed in this section providing the cracks are within the following length/orientation criteria:

- 5/8 inch maximum if crack runs circumferentially.
- 1 inch maximum if crack runs within  $\pm 45^\circ$  longitudinal.
- 1-1/2 inch maximum if crack runs within  $\pm 10^\circ$  longitudinal.

(14) Weld sweep support plate to sweep arm

Repair ok for any length crack occurring in this weld providing it does not extend and penetrate into parent metal of adjoining structural elements. Cracks penetrating into adjoining structural elements must be evaluated based on criteria established for those elements.

## INSPECTION AND REPAIR CRITERIA

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(15) Sweep support plate.

Repair of cracks in the sweep support plates themselves is ok providing cracks are within the following length/orientation criteria:

5/8 inch maximum if crack runs transverse to the axis of the pipe or arm.

7/8 inch maximum if crack runs within  $\pm 45^\circ$  of parallel to the axis of the pipe or arm.

1-1/4 inch maximum if crack runs within  $\pm 10^\circ$  of parallel to the axis of the pipe or arm.

(16) Sweep arm in outer section in zone contained between sweep support plate and head attachment flange

Crack repair in the wall of the sweep arm (0.365 inch wall A53 pipe) is allowed in this section providing the cracks are within the following length/orientation criteria:

7/8 inch long if crack runs circumferentially.

1-1/4 inch long if crack orientation is within  $\pm 45^\circ$  of longitudinal.

2 inch long if crack orientation is within  $\pm 10^\circ$  of longitudinal.

(17) Sweep arm outer section at edge of motor mount attachment plate.

Crack repair in the wall of the sweep arm is allowed in a small region near this point providing the cracks do not exceed 3/4 inches maximum in any orientation.

(18) Sweep arm outer section at tips of gussets for head attachment flange.

Crack repair in the wall of the sweep arm is allowed in a small region near this point providing the cracks do not exceed 7/8 inch maximum in any orientation.

### C. Sweep inspection criteria/instructions

(1) Remove paint and corrosion from at least the critical areas to be inspected by cleaning, sandblasting, or other appropriate means.

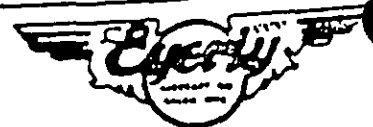
(2) To fully define cracks that might exist, conduct visual and magnetic particle inspection (and if/as required select ultrasonic inspection) of at least the structurally critical areas. This inspection work to be conducted by competent professionals in NDT inspection technique.

(3) Crack locations and extent must be appropriately identified and marked so that repair can be satisfactorily performed.

(4) Cracks found to be of an extent beyond the repairable crack criteria should be discussed with the factory to establish if in fact the sweep can be repaired.

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D \*Sweep repair criteria/instructions

(1) Cracks or other significant flaws or defects that have been detected, identified, and marked are to be completely removed to their full extent by the carbon arc/air (air/arc) technique or suitable equivalent by a competent certified welder.

(2) High quality arc weld repair for low hydrogen with suitable gas shielding is to be performed by a competent certified welder. AWS E70S-3 or AWS E70S-6 wire would be suitable selections for weld repair work on the sweep. Wire size selections should be appropriate for the size of each weld repair. Crack repairs in the spindle should be preceded by spindle preheat 250° F to 300° F.

(3) Following weld repair, the repaired areas should be reinspected to insure soundness.

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SPINDLE

TOP VIEW

TOP VIEW

LONGITUDINAL

CIRCUMFERENTIALLY

LONGITUDINAL

SIDE VIEW

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The maximum allowable bushing (total diametral) clearance (outer plus inner clearance) recommended by the factory is .035 of an inch. If this allowable clearance in either the upper or lower column bushing (P-7) is approached or exceeded, it should be replaced with a factory new bushing. Contact the Eyerly Aircraft Company parts department to order new bushings. (phone 503 399 7706).

If the allowable bushing clearance condition is found to be exceeded, it is necessary for the factory to know the extent of wear on the outside diameter of the hinge column (upper and lower) bushing surfaces (bushing band).

For this purpose it is necessary that the dimensional data taken on the actual parts (tabulated in the previous charts) be sent to the factory to insure that the hinge column bushing surfaces are still within specifications. If the O.D. of the upper column band (P-226) is not within specifications, replace both the upper (P-226) and lower (P-234) band. If the upper column band is within specifications and the lower band is not, only replace the lower band (P-234). If it becomes necessary to replace either band, Eyerly Aircraft will furnish instructions.

## INSPECTION AND REPAIR CRITERIA

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# SECTION VI

## SUPPORT ROD ASSEMBLY - INSPECTION AND REPLACEMENT CRITERIA AND INSTRUCTIONS

Very carefully inspect the support rod assemblies (support rods, rod nuts, rod bushings, rod end plates, swivel blocks and pins) and replace any parts with signs of excessive wear. Support rods needing replacement are to be replaced in pairs. Inspect the support rods and support rod nuts as mentioned below.

Remove all paint and inspect for hair line cracks along the entire length of the rods, using appropriate dye penetrant or magnetic particle inspection techniques. Check for any signs of bending or kinking in the rods. Inspect the threads for corrosion or wear and measure the diameter across the threads. The minimum allowable diameter is 1.232 inches. Replace the support rods (P-196) in pairs if they have any of the problems mentioned above. Do not attempt to repair the support rods.

Inspect the nuts for corrosion or wear and measure the diameter across the threads on the inside diameter of nut (do not measure across nylon). The maximum allowable diameter is 1.178 inches. Also check the condition of the nylon insert in the nut to insure its locking capability. Replace the nuts (P-350) if they have any of the problems mentioned above.

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## SECTION VII

### Mud sill structural elements - Inspection and repair criteria and instructions

#### 1. Definition of repairable defects.

Any size crack or defect occurring in only weld metal is considered to be repairable providing it occurs only in the weld metal and does not penetrate into the wall thickness of the parent metal.

Cracks initiating in weld metal and penetrating into the wall of parent metal must be evaluated based on criteria for cracks/defects in parent material.

Cracks or defects occurring in or penetrating into the wall thickness of the parent metal are considered repairable so long as their extent is found to fall within the established criteria for repairable crack size and orientation. The criteria establishing allowable crack/defect sizes that are considered repairable varies significantly depending on the location of the flaw and its orientation. Cracks that are found to exceed our criteria for repairability should be discussed with the factory to establish whether or not the component is repairable or must be replaced with a factory new part.

The repair criteria to be used assumes that, following repair, the qualification kit will be added before the ride is placed back in operation.

#### Repairable cracks/defects criteria.

##### (1) Mud sill attachment plates on P-188 for mud sill tie rod:

Cracks up to 1/4 inch in length are considered repairable for any crack orientation located in these plates in the vicinity of the attachment pins.

##### (2) Weld joining above Plates to P-188:

Any size crack or defect in this weld is repairable.

##### (3) Remainder of mud sill compression member P-188:

Any size cracks or defects in this member are considered repairable.

##### (4) Mud sill tie rod P-187:

Significant cracks are not considered repairable in this member. Contact factory to discuss repairability of specific crack configurations.

## INSPECTION AND REPAIR CRITERIA

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... Mud sill structural elements inspection criteria/instructions.

- (1) Remove paint and corrosion from at least the critical areas to be inspected by cleaning, sandblasting or other appropriate means.
- (2) All inspection work to be conducted by competent professionals in NDT inspection technique.
- (3) All weld joints are to be fully inspected by the magnetic particle technique.
- (4) All structural members are to be fully inspected by the dye penetrant or magnetic particle inspection technique plus very careful visual inspection.
- (5) Crack locations and extent must be appropriately identified and marked so that repair can be successfully performed.
- (6) Cracks found to be of an extent beyond the repairable crack criteria should be discussed with the factory to establish a suitable repair action.

D. Mud sill structural elements repair criteria/instructions

- (1) Cracks or other significant flaws or defects that have been detected, identified and marked are to be completely removed to their full extent by the carbon arc/air (air/arc) technique or suitable equivalent by a competent certified welder.
- (2) Very high quality weld repair using gas metal arc welding (GMAW) and low hydrogen technique with suitable gas shielding is to be performed by a competent certified welder. AWS E-70S-3 or AWS E70S-6 wire would be suitable selections for the weld repair work on the basically all mild steel structure. Wire size selections should be appropriate for the size of each weld repair. Suitable multipass technique and interpass cleaning technique to be used as required.
- (3) Following the weld repair, the repaired areas should be re-inspected to insure soundness.

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## SECTION VIII

Stub arms - inspection and repair criteria and instructions.

### A. Definition of repairable defects.

The factory considers that virtually any level of fatigue damage or structural cracking that has occurred in the stub arms can be repaired.

### B. Repairable cracks/defects criteria

(1) Stub arm attaching points - mounting bracket/flange.

Whereas any size crack occurring in this bracket is considered repairable, the factory would appreciate being notified of any cracks in the bracket itself which extend through greater than 40% of the total depth or thickness of the bracket.

(2) Stub arms themselves.

Whereas any size crack occurring in the arms is considered repairable, the factory would appreciate notification of cracks found in the arms that exceed 1-1/2 inches in length in any orientation.

### C. Stub arm inspection criteria/instructions

Inspection criteria/instruction similar to that described in Section VII, paragraph (C) for the mud sill structural elements.

### D. Stub arm repair criteria/instructions.

Repair criteria/instructions similar to that described in Section VII paragraph (D) for the mud sill structural elements. The stub arms themselves are fabricated from EX TEN and COR TEN, however, the AWS E70S-3 or AWS E70S-6 wire for repair is still considered applicable.

INSPECTION & REPAIR CRITERIA

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## SECTION IX

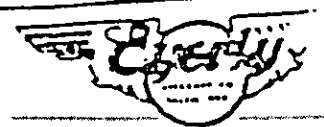
### OTHER STRUCTURAL ELEMENTS

In our sections I through VIII we have given inspection and repair criteria and instructions for specific structural components/elements of the MONSTER in preparation for the subsequent installation of the MONSTER Modification Kit. All remaining structural elements of the MONSTER (an example of which would be the parts of the eccentric) are to be inspected and repaired in a similar manner as generally described for the specifically covered components in Sections I through VIII. Please notify the factory of any fatigue damage or structural cracking found in those other structural elements.

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#### INSPECTION AND REPAIR CRITERIA

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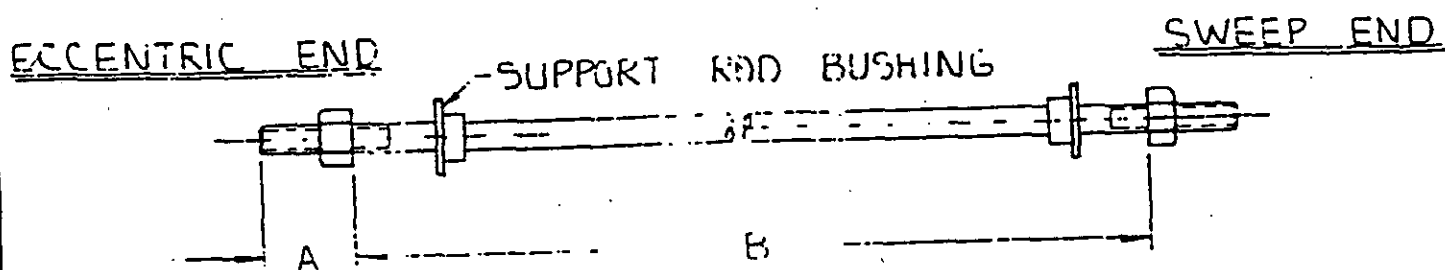


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## SUPPORT ROD LENGTH ADJUSTMENT

To insure even load distribution of both support rods, follow these instructions carefully.

(1) As previously mentioned in the dis-assembly instructions, distances A and B are to be measured and recorded prior to removal of the support rod end nuts. Keep paired rods together. Measure distances on all 12 rods.



(2) While being re-assembled, dimensions A and B should be adjusted to within 1/8 inch of their original lengths.

(3) Now finely adjust dimension B on one rod to within 1/16 to 1/32 inch of dimension B on its paired mate. Completely re-assemble and install on machine.

(4) Final adjustment will be as follows when the machine is operational.

(5) Adjust the support rods on one sweep at a time by rotating the eccentric crank until it lines up with the sweep to be adjusted. (The sweep will be down.) While standing at the end of the sweep, sight down rods. If the rods are bowed to the left, loosen one of the nuts on the right hand support rod until both rods are straight. If the rods are bowed to the right, loosen one of the nuts on the left hand support rod until both rods are straight. Adjust the support rods on all six sweeps in this manner.

## SUPPORT ROD LENGTH ADJUSTMENT

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AUG 16 1994

U.S. CONSUMER PRODUCT SAFETY COMMISSION

WASHINGTON, D.C. 20207

DEPARTMENT OF LABOR  
CARNIVAL & AMUSEMENT RIDE  
INSPECTION DIVISIONDivision of  
Corrective Actions  
Tel: 301-504-0508  
Fax: 301-504-0359OFFICE OF COMPLIANCE  
AND ENFORCEMENT**AMUSEMENT RIDE SAFETY ALERT!****ATTENTION! STATE AMUSEMENT RIDE SAFETY OFFICIALS****EYERLY AIRCRAFT  
"OCTOPUS, SPIDER & MONSTER RIDES"  
August 16, 1994**

On August 10 - 11, 1994, the U.S. Consumer Product Safety Commission (CPSC) in conjunction with the Commonwealth of Kentucky's Department of Rights & Measures, investigated two cars/tubs removed from an "Octopus" amusement ride involved in an accident on August 3, 1994, at the Estill County Fair in Irving, Kentucky. The accident involved the failure of a car that contained two male passengers. The car's tubular framing fractured behind and under the seat causing the two passengers to be dragged and then dumped from the car. CPSC staff have preliminarily determined the cause of the accident to be due to excessive corrosion and fracturing of the tubular structure supporting the hub under the car's seat. The corrosion appears to have been as a result of water draining from the drain holes and collecting in the gap between two under-side tubes and their fiberglass covering. The corrosion was greatest near the drain holes. Fracture of these tubes is believed to have preceded the fracture of the car's other frame tubes.

The rides were manufactured from 1936 to the mid-1970's by the defunct Eyerly Aircraft Co., Salem, Oregon. No new rides are being made, although parts can be purchased from Oregon Rides, Salem, OR. The rides involved are all "Octopus" and "Spider" with fiberglass or metal covered tubs/cars and "Monster" rides with serial number 22 and above.

While the CPSC's investigation into the cause of the failure continues, in the interim, we recommend inspection of the cars critical areas, as follows:

1. The critical areas are identified as the four tubes under the car seat that are covered by fiberglass. The tubes are shown in the attached schematic based on the Eyerly Aircraft Company drawing O-913 entitled "Octo & Spider Car Back Section."

2. Inspection by radiography is recommended if ride owners do not want to remove the fiberglass covering the car's tubing. It is recommended to have the radiography done by a class III technician. NOTE: Ultrasonic inspection is not recommended as tube roughness may make an accurate interpretation extremely difficult.
3. A visual inspection of the tubing may be done, but the fiberglass covering the tubing would need to be removed first for an adequate inspection.
4. Fiberglass removal techniques must be obtained from Oregon Rides prior to removing any fiberglass.
5. If excessively corroded or cracked tubing is found during the inspection, those tubes or the car should be replaced.
6. It is our understanding that a retrofit/fiberglass repair kit is being developed by Oregon Rides, Inc. CPSC will be evaluating the adequacy of this repair kit.
7. Magnetic particle inspection may be used to inspect the numerous welds around the hub and tubing of car back's underside.

Corrosion and cracking may also be found in non-critical areas of the seat front and seat back of the car. This corrosion and cracking may also be concealed by the fiberglass covering the car. Again, if corrosion or cracking is found, consult with Oregon Rides about the repair.

For further information or clarification on this Safety Bulletin you may contact one of the following:

US CPSC  
Division of Corrective Actions  
Jay DeMarco at (301) 504-0608 ext 1353  
Division of Mechanical Engineering  
Tom Caton at (301) 504-0494 ext 1305

Commonwealth of Kentucky, Dept. of Weights & Measures  
Carl Dills at (502) 564-4870

Oregon Rides, Inc., Salem, OR  
at (503) 588-0984.



U.S. CONSUMER PRODUCT SAFETY COMMISSION  
WASHINGTON, D.C. 20207

OFFICE OF COMPLIANCE  
ENFORCEMENT

Division of  
Corrective Actions  
Tel: 301-504-0608  
Fax: 301-504-0359

## **AMUSEMENT RIDE SAFETY ALERT!**

### **ATTENTION! STATE AMUSEMENT RIDE SAFETY OFFICIALS 2nd NOTICE**

#### **EYERLY AIRCRAFT**

#### **"OCTOPUS, SPIDER & MONSTER RIDES"**

September 13, 1994

As noted in our August 16, 1994 Safety Alert, the U.S. Consumer Product Safety Commission (CPSC) in conjunction with the Commonwealth of Kentucky's Department of Weights & Measures, investigated an accident involving an "Octopus" amusement in Irvine, Kentucky. The accident involved the failure of the car's tubular framing behind and under the seat causing the two passengers to be dumped from the car. CPSC staff have preliminarily determined the cause of the accident to be due to excessive corrosion (wide pits, deep pits, and perforation) and fracturing of the tubular structure supporting the hub under the car's seat. The corrosion appears to have been as a result of moisture collecting in the gap between two under-side tubes and their fiberglass covering. Fracture of these tubes is believed to have preceded the fracture of the other frame tubes.

The rides were manufactured from 1936 to the mid-1970's by the defunct Eyerly Aircraft Co., Salem, Oregon. No new rides are being made, although parts can be purchased from Oregon Rides, Salem, OR. The rides involved are all "Octopus", "Spider" and "Monster" rides with fiberglass covered tubs/cars. Production of fiberglass cars began in 1964. These tubs/cars are believed to be used interchangeably by the industry. Those fiberglass tubs/cars that are 15 years and older are considered the most likely to have hidden corrosion.

The CPSC recommends inspection of the cars critical areas. The following text provides information about using either destructive or nondestructive techniques for the examination of the tubing that is covered by fiberglass matting on the underside of a car seat.

#### General Inspection Comments

The inspection for possible corroded or cracked tubing hidden by a fiberglass covering may be done by either destructive or nondestructive methods. Either method is to be used in conjunction with the use of visual inspection or magnetic particle inspection of the car's other underside tubing that is not covered by fiberglass. Attachment 11 shows the location of the tubing that is the subject of this bulletin. This bulletin is not intended to exclude the inspection of other components of the cars or ride as described by the manufacturer and past and present parts suppliers.

Cars that are known to be over 15 years old or those cars whose age cannot be verified to be less than 15 years old are subject to this inspection recommendation. Follow up inspections are to be done at 5-Year intervals after the initial inspection.

The number of cars on an individual ride to be inspected should be based on whether or not that cars have a history of being together as one unit. If the ride's cars have an unknown history or if the cars are known to not have always been together as a unit, then all of that ride's cars should be inspected. The inspection should be repeated in succeeding 5-year intervals. If all of a ride's cars have a known history of always being together as a unit, then one-third of that ride's cars may be selected for examination. This first one-third of a ride's cars should not be examined again if the cars remain together as a unit until each third has been examined over each succeeding 5-year inspection interval. Consult with Oregon Rides about all instances of tubing corrosion, perforation, or cracking.

The fracture of the other frame tubes may be assisted by the distortion of the underside tubes during handling. This distortion may have increased the stress in the frame increasing the probability of crack initiation. These other tubes should be inspected for straightness. This inspection should be combined with a visual or magnetic particle inspection of this other exposed tubing. This should be done in addition to the ride owner's choice of doing a destructive examination or a nondestructive examination of the tubing that is covered by the fiberglass matting. Oregon Rides is preparing a bulletin providing detailed information about the examination of a car's exposed tubing.

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### Destructive Examination

Destructive examination of the tubing is intended to be only destructive to the fiberglass matting that bonds the tubing to the underside of the fiberglass seat. It is destructive because the examination entails the incremental removal of 1-inch wide strips of fiberglass matting with a blade. The tubing and the fiberglass seat material is not to be cut. The destructive examination should be completed by:

- (1) - Locating a point 12-inches from the car's spindle retainer on the fiberglass matting covering and bonding the two underside tubes that are welded to the spindle retainer to the fiberglass seat. On the fiberglass covering of the two other tubes bonded to the seat bottom, mark a point on these two tubes that is next to the 12-inch point marked on the first two tubes.
- (2) - Locating the edges of the fiberglass matting nearest to the car's drain holes for the four tubes bonded to the car's underside.
- (3) - Starting from the edge of the fiberglass matting, use a blade, without cutting the tubing or fiberglass seat, to remove a 1-inch wide section of fiberglass matting from the four tubes bonded to the fiberglass seat.
- (4) - If no corrosion is observed after removing the first 1-inch wide section of fiberglass matting stop and repair the fiberglass matting according to instructions from Oregon Rides.
- (5) - If light surface corrosion that does not reduce the wall thickness is observed, continue removing 1-inch wide sections of fiberglass matting until no corrosion (clean metal surface) is observed or the 12-inch point described above is reached. If only light surface corrosion that does not reduce the wall thickness is observed, clean the tube surface with a wire brush and repair the fiberglass covering according to instructions from Oregon Rides.
- (6) - If severe corrosion, deep or wide pitting, wall penetration, or wall cracking is observed, then the tubing should be replaced and bonded to the fiberglass seat with new fiberglass matting according to instructions from Oregon Rides.
- (7) - The other tubing that is not covered by fiberglass matting may be inspected by visual inspection or magnetic particle inspection techniques according to instructions from Oregon Rides.

### Non-Destructive Examination

- (1) - The non-destructive examination involves radiography of the underside tubing through the fiberglass seat and fiberglass matting covering the underside tubing. The examination can be done by a Level II or III Inspector qualified in radiography.
- (2) - If the radiography does not reveal any corrosion, deep or wide pitting, perforation, or cracking in the tubing, then the tubing shall be considered to be not affected.
- (3) - If corrosion is observed, the corrosion should be exposed by removing 1-inch wide increments of the fiberglass matting from the tube. Remove 1-inch wide sections of fiberglass matting until no corrosion is observed. (a) If only light surface corrosion that does not reduce the wall thickness is observed, use a wire brush to clean the corrosion from the tube surface and repair the fiberglass covering according to instructions from Oregon Rides. (b) If severe corrosion, in the form deep or wide pitting, wall porosity, or through wall thickness cracking is observed, then the tubing should be replaced and bonded to the fiberglass seat with new fiberglass matting according to instructions from Oregon Rides.
- (4) - The other underside tubing, not covered by the fiberglass matting, may be inspected by visual inspection or magnetic particle inspection techniques.

For further information or clarification on this Safety Bulletin you may contact one of the following:

US Consumer Product Safety Commission  
Division of Corrective Actions  
Washington, DC

Jay DeMarco at (301) 504-0608 ext 1353  
and

Division of Mechanical Engineering  
Thomas Caton at (301) 504-0494 ext 1303  
or

Oregon Rides, Inc.  
Portland, OR

Guy Sherborne, Sr. at (503) 588-0984.



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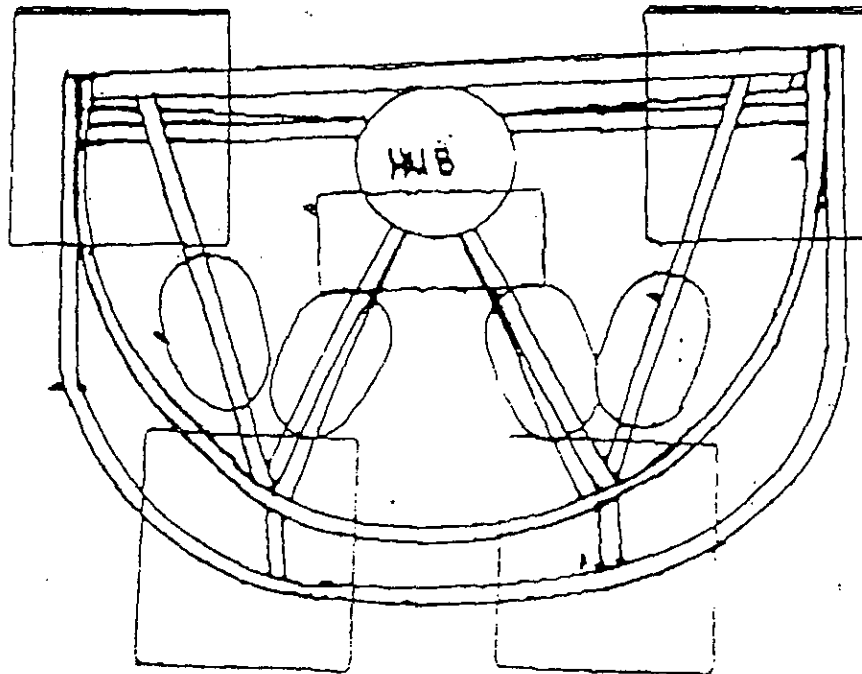
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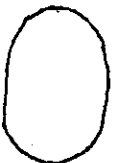
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Attachment 11 - Examination Areas for Destructive/Non-Destructive and Visual/ Magnetic Particle Techniques



- Areas to be examined by visual or magnetic particle inspection techniques

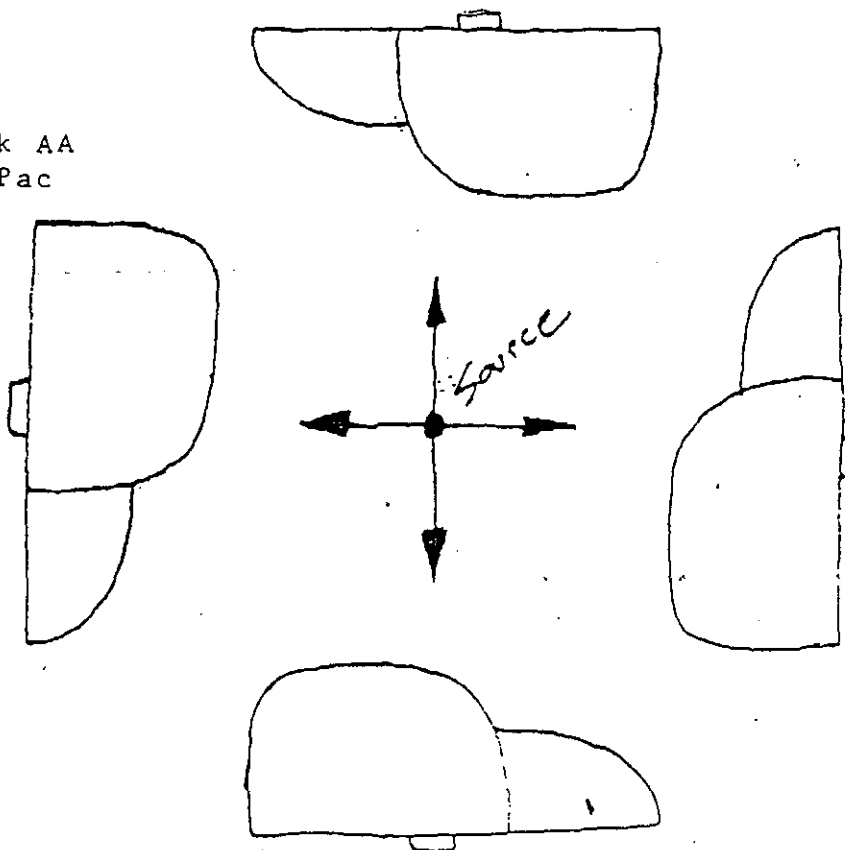


- Areas to be examined by destructive or non-destructive radiographic techniques

OREGON RIDES INC.

RIDE SEATS

Seats shot 4 at a time. Source in center at 48" SFD  
IC 192 at 70ci  
TIME : 1:00  
SCREENS: 0  
FILM : Kodak AA  
DayPac



FILM PLACEMENT

PREPARED BY

*[Signature]*  
LII

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