WISDOM INDUSTRIES, Ltd.

Pat Powell State

SAFETY BULLETIN

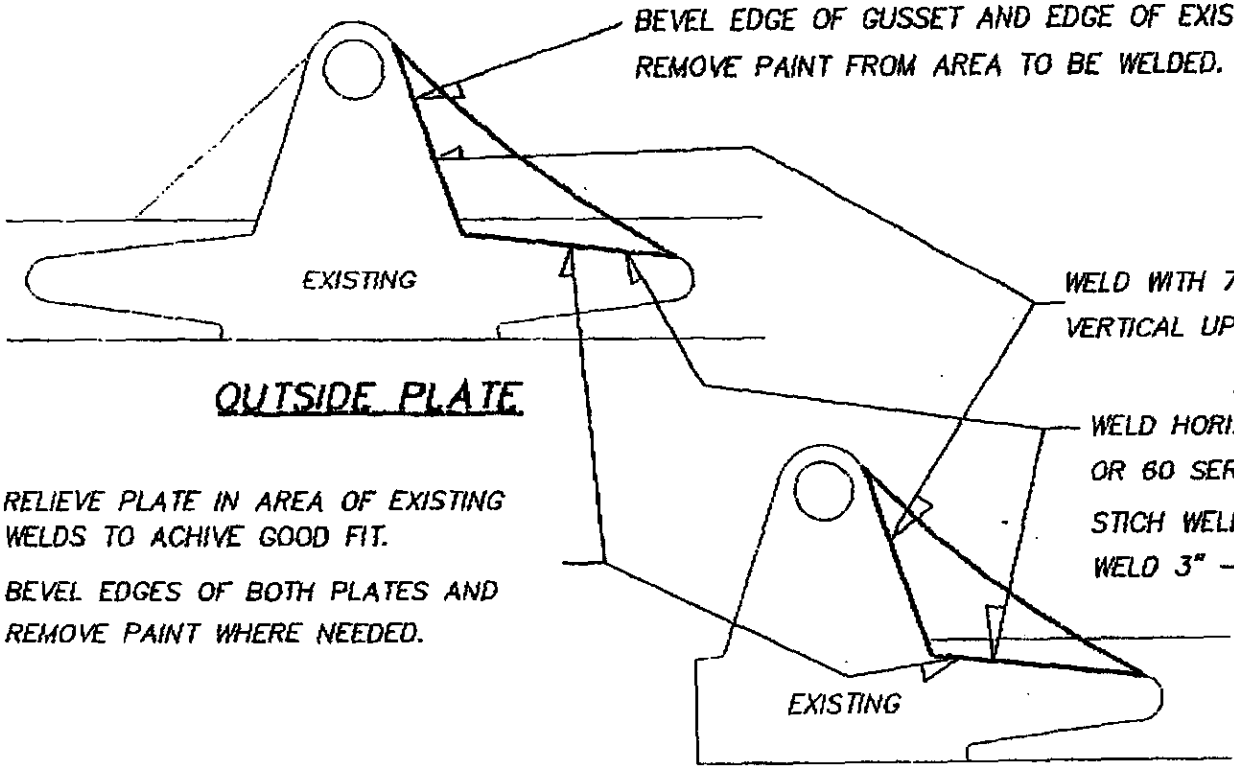
DATE: FEBRUARY 7, 2006
RIDE: TORNADO
SUBJECT: LIFT ARM REINFORCEMENT
COMPLIANCE DATE: 1 MONTH WITH DAILY INSPECTION UNTIL INSTALLED.

1. Install 4 reinforcing gussets on the Tornado lift arm.
2. Clean area where plates are to be installed.
3. Inspect arm for cracks.
4. "V" any cracks.
5. Weld cracks with 7018 low hydrogen rod.
6. Weld reinforcing gussets to side plates.
7. Inspect welds for cracks.
8. Prime and paint new metal.

If you have any questions, contact Wisdom Industries, Ltd. at 970-522-7515.

PLACE ON SIDE CLOSEST TO CENTER

BEVEL EDGE OF GUSSET AND EDGE OF EXISTING PLATE.
REMOVE PAINT FROM AREA TO BE WELDED.

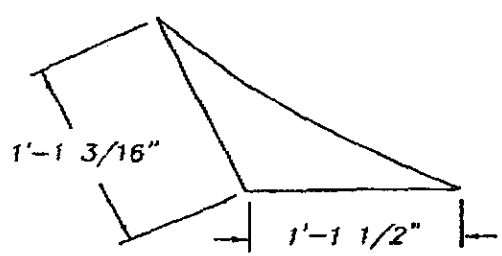


OUTSIDE PLATE

RELIEVE PLATE IN AREA OF EXISTING WELDS TO ACHIVE GOOD FIT.

BEVEL EDGES OF BOTH PLATES AND REMOVE PAINT WHERE NEEDED.

INSIDE PLATE



WISDOM INDUSTRIES Merino, CO 80741

SCALE: 1"=1'-0"	APPROVED BY:	DRAWN BY: MFK
DATE: 08-28-96		REVISED.

DESCRIPTION: CYLR SHAFT MTG PLATE GUSSET

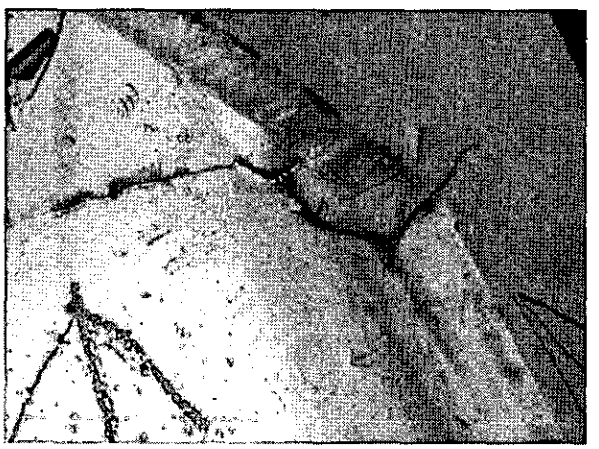
EQUIPMENT:	DRAWING NUMBER
TORNADO	8T 312

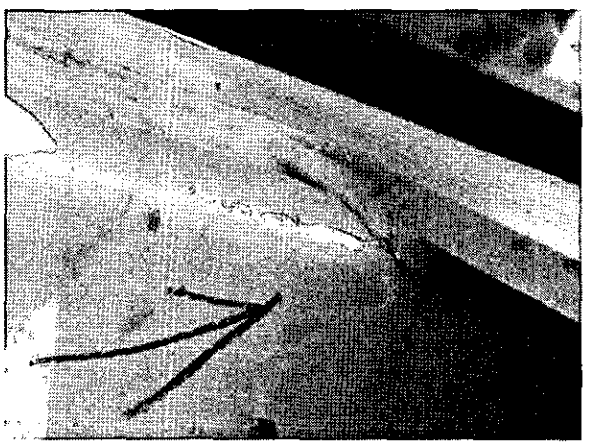
28, 1996 - 14:30:26 < F:\TORNADO\8T31201 >

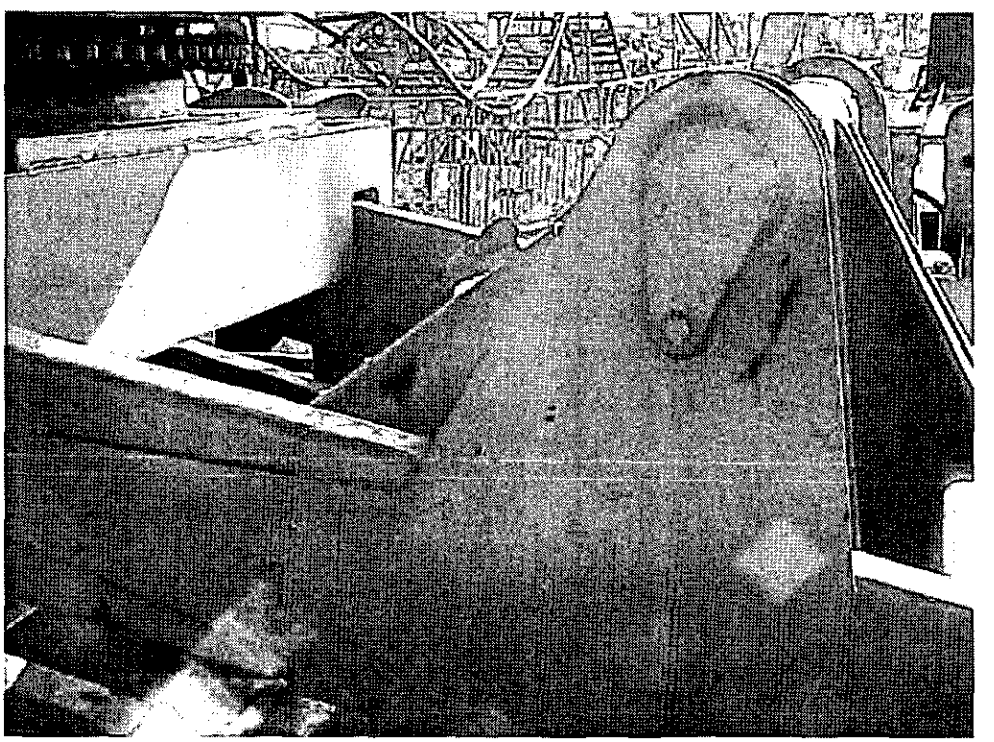
Report on Cracks Found in Tornado Amusement Ride
Submitted to CARES November 3, 2004
Bob Cate, Louisiana State Fire Marshal Office

This is to serve as a "heads-up" message. Last week two of my Inspectors were doing setup inspections. While doing the Tornado, they discovered cracks on the main center lift arms of the ride. These cracks are located on the inside of the main lift arm gusset plates. These cracks may be seen by standing on the fender of the trailer looking down at the support arm gussets. The manufacturer has a re-enforcement gusset kit available, but no bulletins have been issued for this problem/repair.

It may be a good idea to check this area out on any Tornado you may have in your jurisdiction. Here are three photos of the crack found:







WISDOM INDUSTRIES, Ltd.

SAFETY BULLETIN

DATE: FEBRUARY 7, 2006
SUBJECT: TORNADO
COMPLIANCE TIME: 1 MONTH
- ❖ RIDE EFFECTED TORNADO

PARTS EFFECTED: LOWER HYDRAULIC LIFT CYLINDER HINGE PIN

PROCEDURE:

1. Raise ride.
2. Install prop brace.
3. Lower ride until weight is fully on the prop brace.
4. Turn off main power.
5. Remove lower cylinder pin retaining bolt.
6. Remove hinge pin.
7. Measure from bottom of hole to outside of ear.
8. Pin must be within 1/8" of bottom of hole to bottomed out.
9. If pin is more than 1/8" from bottom of hole, contact Wisdom for a replacement pin. *(Have the indicated dimension available).
10. If pin is acceptable, reinstall pin.
11. Install retaining bolt with lock washer.
12. Repeat for second cylinder.

If you have any questions, contact Wisdom Industries, Ltd. at 970-522-7515

WISDOM INDUSTRIES, Ltd.

SERVICE BULLETIN

DATE: **JANUARY 6, 2007**
RIDE: **ALL TORNADO'S**
SUBJECT: **TORNADO SEAT SPINDLE PIPE SLEEVES MANDATORY**

There has been an incident in which two passengers had their arms injured while riding a Tornado. We have developed a sleeve that must be installed on existing Tornado's. Contact Wisdom Industries, Ltd. for the modification kit.

INSTALLATION INSTRUCTIONS

1. Remove one galvanized sleeve from the package.
2. Place sleeve above the turn wheel around the seat spindle pipe.
3. Carefully interlock, the formed edge of the galvanized sleeve.
   - **NOTE:** Included in this kit are two hose clamps to help in locking the sleeve edges together.
4. Place one clamp at the top of the sleeve while the edges are started into the formed groove. Snug the clamp to hold the edges in place.

5. Place the second hose clamp about 1 to 2 inches below the first one and snug up drawing the two edges into the interlock groove.
6. Loosen the upper clamp and slide it down against the second clamp. Snug it up.
7. Loosen the lower clamp and slide it down 1 to 2 inches and tighten.
8. The edges should snap into place. If not keep working the clamps down until the edges lock into place.
9. Remove the hose clamps.
10. Place a piece of Trim Lock on the top and bottom edge of the sleeve to prevent passengers from cutting their hands on the sharp edge of the sleeve.
11. Cut the Trim Lock so that the ends butt together.
12. Make sure that the sleeve turns freely on the spindle pipe. If not remove the sleeve and fix the area that is holding the sleeve from turning.
13. Repeat for the rest of the cars on the Tornado.

If you have any questions about the installation of the kit, please contact Wisdom Industries, Ltd. at 970-522-7515.

- **NOTE: We have a second style of sleeve available also. It is a spiral wrap polyethylene plastic that wraps on each pole.**
  Either system is acceptable.

WISDOM INDUSTRIES, Ltd.

SAFETY BULLETIN

DATE: February 24, 2004
RIDE: TORNADO
SUBJECT: MAIN SEAT PIPE WEAR
COMPLIANCE DATE: IMMEDIATE

DURING TRANSPORTATION THE UPPER SEAT HALF IS MOVING SIDEWAYS AND WEARING ON THE MAIN SEAT PIPE. THIS WEAR CAN CAUSE A WEAKENING OF THE SEAT PIPE AND THE POTENTIAL OF FAILURE AND INJURY.

1) Inspect seat pipes (approximately 6" below the spin wheel) for wear in the pipe. (Review attached drawing)

2) Measure the depth of wear.

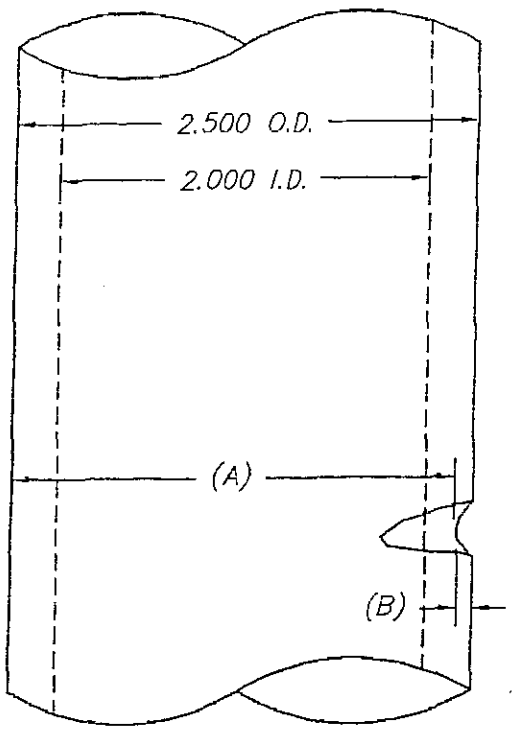
3) If the depth of wear is greater than .062 inch, the pipe must be replaced. (See Drawing)

4) Install Trim Lock around the inside of the upper seat half that is causing wear on the pipes.

5) You may need to enlarge the hole in the upper seat half to reduce the chance that wear will occur. If hole is enlarged, sand edges smooth and install trimlock.

   - **NOTE:** Keep the transport turnbuckles tight to prevent wear from occurring.

6) Contact Wisdom Industries, Ltd. for replacement procedure at (800) 634-6097 if you have any questions.



INSTRUCTIONS:

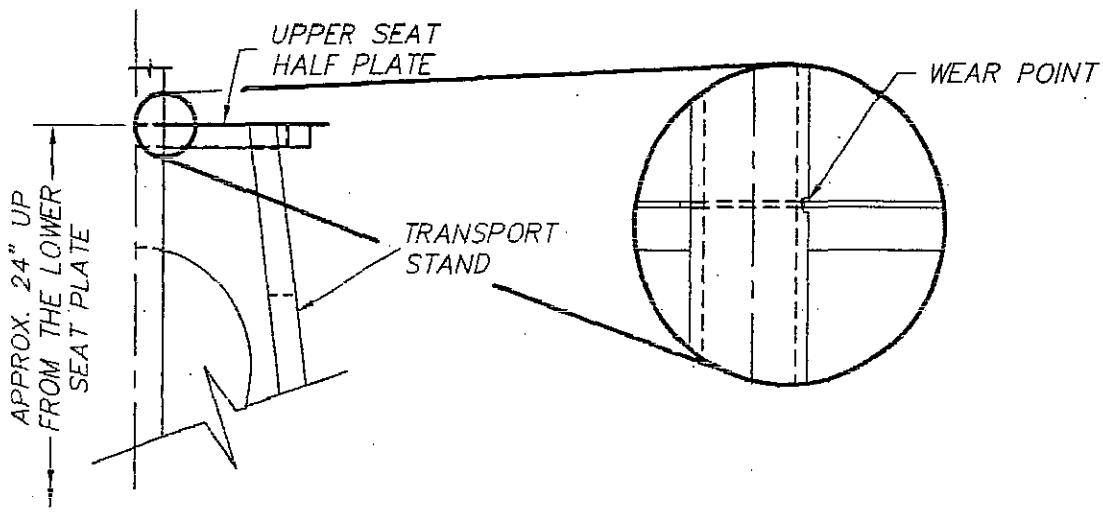
1. MEASURE ACROSS THE CENTER POLE AT THE DEEPEST PART OF THE GROOVE (A). IF THE WIDTH IS LESS THAN 2.438" AT THE NARROWEST POINT, THE CAR WILL HAVE TO BE RED TAGGED AND THE CENTER POLE REPLACED.

2. MEASURE FROM THE SURFACE TO THE DEEPEST WEAR AREA (B). IF THIS DEPTH IS MORE THAN 0.062" THE CENTER POLE MUST BE REPLACED.

3. IF THESE DIMENSIONS ARE WITHIN 0.02" OF REJECTION. MAKE A RECORD OF THIS AND REMEASUREMENT EVERY WEEK.

4. ONCE THE CENTER POLE IS AT THE POINT OF REJECTION THAT CAR MUST BE RED TAGGED. IF CRACKING OF THE PIPE IS SHOWING THE RIDE MUST BE SHUT DOWN UNTIL THE CENTER POLE IS REPLACED.

DAILY INSPECT ALL POLES SHOWING WEAR FOR CRACKING IS REQUIRED



SHOWN IN TRANSPORT POSTION

WISDOM INDUSTRIES Merino, CO 80741	APPROVED BY:	
DESCRIPTION: WEAR FACTOR ON SEAT CENTER POLE		SCALE: FULL DATE: 02/24/04
EQUIPMENT: TORNADO	DRAWN BY: JJR	DRAWING NUMBER: 8T 070

FEB 27, 2004 - 13:03:28 < L:\TORNADO\8T070D1.DWG >

WISDOM INDUSTRIES, INC

TORNADO BULLETIN

DATE: OCTOBER 1997
RIDE: TORNADO
SUBJECT: Tornado Seat Safety Plate
COMPLIANCE: **Due to the possibility of a wheel bearing failure causing the spindle nut to unscrew, install the safety plates and new greaseable dust cap before further operation.**

Installation

1. Remove two seat hold down pins.
2. Raise upper half of seat assembly using the winch and lift bracket provided with each.

> WARNING: **Turn the upper seat half over the lower seat assembly and place a C-clamp on the pipe under the upper seat half as a safety in case the upper seat half should fall while installing the plates. Leave the winch holding the seat half.**

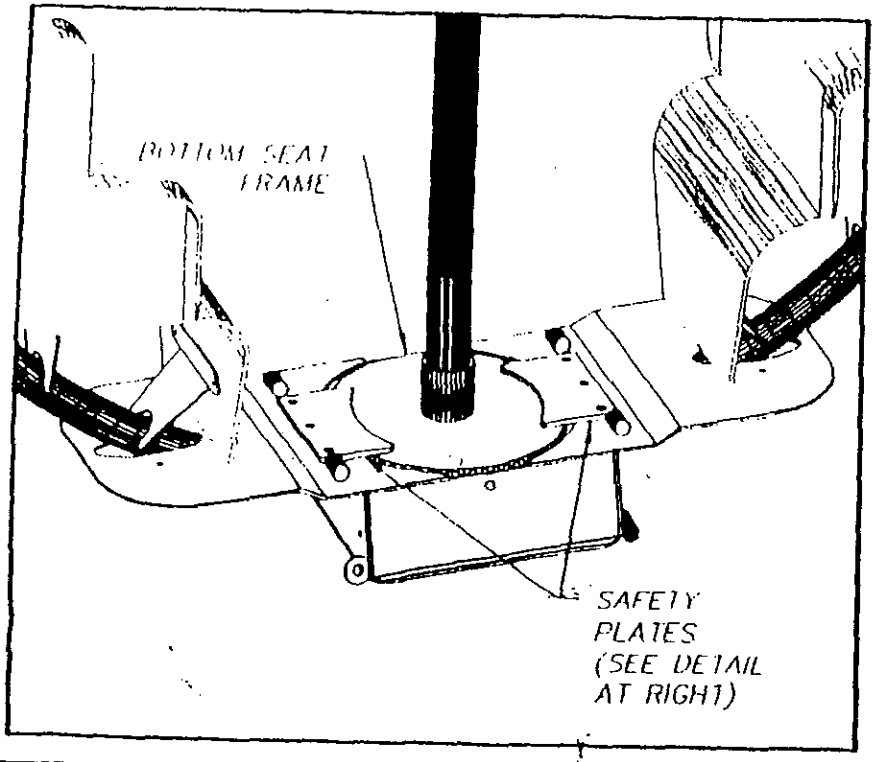
3. Review the attached drawing for locating the safety plates. Two plates per car.
4. Drill three 1/2 inch holes for each plate. 6 for each car.

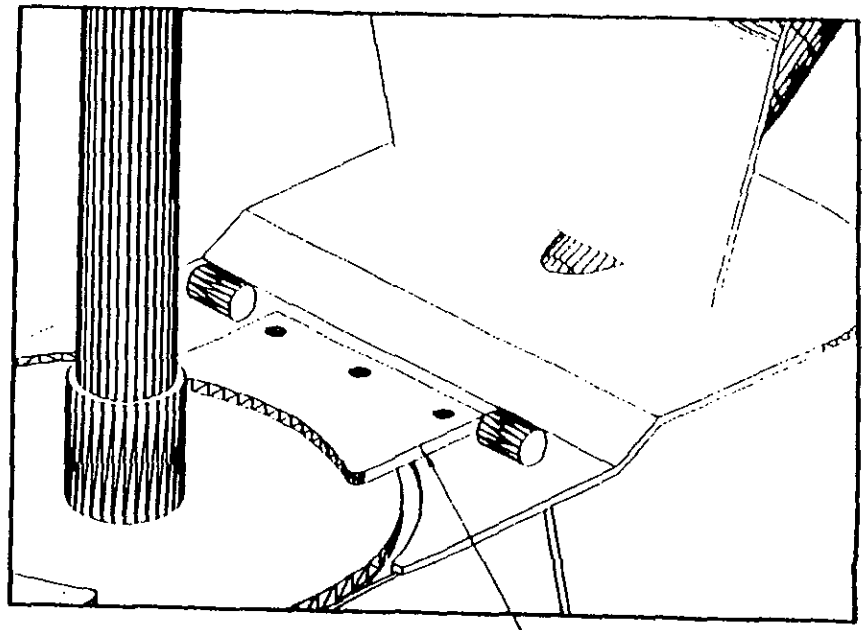
> **Note:** Make sure the edge of the plate does not protrude past the seat locator bosses. If the plate is too far out, the upper seat half will not lower fully into position.

5. Bolt the safety plates to the lower seat frame with six 1/2 inch, grade 5 bolts and lock nuts.
6. Check that the seat brake airline will not catch on the safety plates while the seat is turning. Pull up the extra air line to the top of the seat pipe.
7. Remove the C-clamp and lower the upper seat half into position.
8. Check that the upper seat half lowers fully onto the lower seat assembly.
9. Reinstall the two seat hold down pins and R-clip.
10. Remove the wheel dust cover from under the seat assembly.
11. Install the new wheel dust cover.
12. Grease the wheel using the zerk in the new dust cover.
13. Repeat the above procedure for the remaining cars.

Notify Wisdom Industries after the plates have been installed.

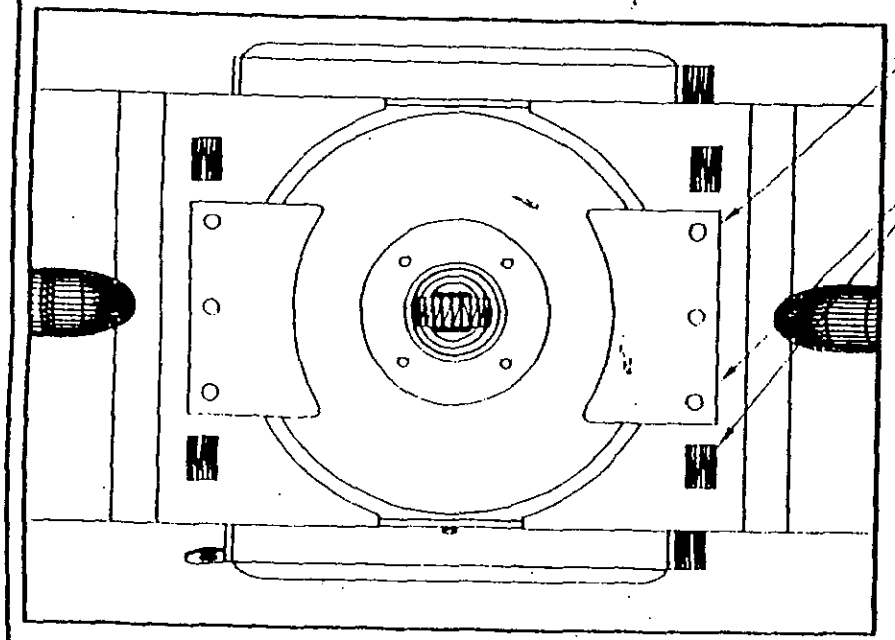
Thank you for your cooperation in this matter. If you have any questions about this bulletin, please feel free to contact us at 1-800-634-6097 or 1-970-522-7515.





INSTALL SAFETY PLATES SHOWN USING THREE ½" GRADE 5 BOLTS AND LOCK NUTS. (SEE BELOW FOR MORE DETAILS.)

NOTE: THIS EDGE MUST NOT PROTRUDE PAST THE SIDE OF THE STOPS.



LINE-UP BACK OF SAFETY PLATES WITH OUTSIDE EDGE OF STOPS AND DRILL THROUGH BOTTOM SEAT FRAME PLATE. BOLT SAFETY PLATES TO BOTTOM PLATE USING THREE ½" GRADE 5 BOLTS AND LOCK NUTS.

WISDOM INDUSTRIES Merino, CO 80741

SCALE: NONE	APPROVED BY:	DRAWN BY: JGK
DATE: 10-13-97		REVISED

DESCRIPTION

SAFETY PLATE INSTALLATION

EQUIPMENT: TORNADO	DRAWING NUMBER 31-04

OCT 13, 19[illegible] 14 27 25 < F \TORNADO\31 04 >

WISDOM INDUSTRIES, Ltd.

SERVICE BULLETIN

DATE: June 1999
RIDE: Tornado/Whirlwind
SUBJECT: Baldor Inverter Program Changes

TO PREVENT DAMAGE TO THE DRIVE CHAIN AND SPROCKET MAKE THE FOLLOWING PROGRAM CHANGE *IN YOUR BALDOR INVERTER.*

If you have any questions or problems making the changes please contact us at 800-634-6097. You can call us to walk you through the programming. Have a portable phone at the ride and the power on.

This change **ONLY** pertains to the **BALDOR INVERTERS.**
If you have a SUMATOMO INVERTER **THERE IS NO NEED TO CHANGE THE PROGRAMMING.** Please ignore this notice.

1. Turn on the power to the ride.
2. Push **PROG** key.
3. If the display calls for Password enter "**WMI**"
   Use the **UP** and **DOWN** arrow keys to set "**W**".
   Push **SHIFT** to move cursor to next space.
   Enter "**M**"

Push **SHIFT** enter "**I**".
Push **ENTER.**

4. Display should read "PRESET SPEEDS".

If not, push **RESET** until "PRESET SPEEDS" shows.

5. Push the **UP** arrow until "ACCEL/DECEL" shows.
6. Push **ENTER.**
7. ACCEL TIME #1 should be 29,
   If not, push **ENTER.**

   Push **SHIFT** until cursor is at the number to change. Use the arrow keys to change the number. Push **SHIFT** to next number to change and then **ENTER** when 29 shows in the display. Push **UP** arrow.

8. DECEL TIME #1 should be 29, change in the same manner as above.
9. Push **RESET** until "ACCEL/ DECEL" shows in display.
10. Push **UP** arrow key until "LEVEL 2 BLOCKS" shows.
11. Push **ENTER.**
12. Push **UP** arrow key to "SYNCRO STARTS".
13. Push **ENTER.** Display will read "SYNCRO OFF"
    Change to "ALL STARTS"
14. Push **ENTER.**
15. Push **UP** arrow key to "ALL STARTS".
16. Push **ENTER.**
17. Push **Up** arrow key to "SYNC SCAN V/F", Change to "35"
18. Push **ENTER.**
19. Push **SHIFT** to move cursor to the 1
20. Push **UP ARROW** to 3
21. Push **SHIFT**
22. Push **UP ARROW** to 5
23. Push **ENTER.**
24. Push **UP ARROW** key to "SYNC SCAN TIME", Change to "5"
25. Push **ENTER.**
26. Push **SHIFT** to move cursor to the 2
27. Push **UP ARROW KEY** to 5
28. Push **ENTER.**
29. Push **RESET**
30. Push **RESET**
31. Push **DISPLAY**
32. Test run the ride.

WISDOM INDUSTRIES, Ltd.

SERVICE BULLETIN

DATE: APRIL 30, 2001
RIDE: TORNADO, WHIRLWIND, SPACE SLED
SUBJECT: LIFT FRAME REINFORCEMENT PLATES
INSPECTION DATE: IMMEDIATELY
INSTALLATION OF PLATES: 2 WEEKS WITHOUT CRACKS, IMMEDIATELY WITH CRACKS

1) Inspect the frame near the 2 x 6 cross tube for cracks. (See Drawing)

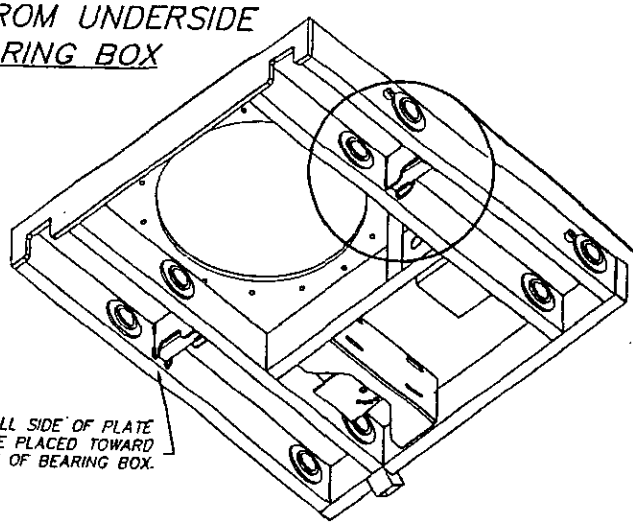
2) If cracks are found, grind the affected area and reweld with 7018 rod and install doubler plates prior to further operation.

3) If cracks are not found, inspect area daily for cracks prior to operation.

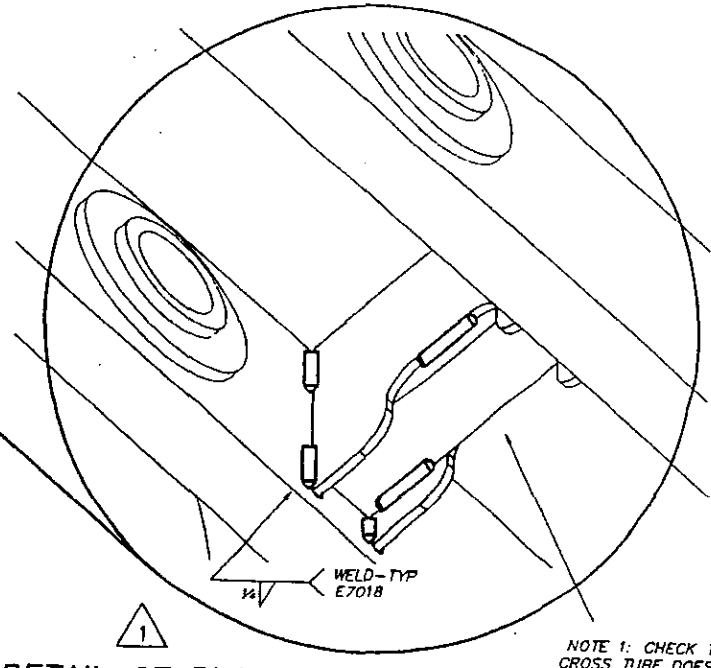
4) If your unit does not have doubler plates, install doubler plates.

5) Contact Wisdom Industries and the plates can be sent out. If you have any questions, contact Wisdom Industries, Ltd. at (800) 634-6097.

VIEW FROM UNDERSIDE OF BEARING BOX



NOTE 3: SMALL SIDE OF PLATE MUST BE PLACED TOWARD THE OUTSIDE OF BEARING BOX.



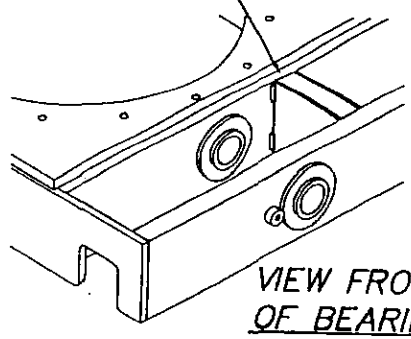
1

DETAIL OF PLATES

NOTE 1: CHECK THAT CROSS TUBE DOES NOT REST ON LIFTING ARM IN THE DOWN POSITION. IF IT DOES, ADD SHIMS TO RAISE OFF OF LIFT ARM.

NOTE 2: NOTCH IS OFFSET TO CLEAR LIFT ARM. WATCH DURING INSTALLATION

NOTE 4: TOP OF PLATES MUST BE FLUSH WITH TOP OF BEARING BOX.



VIEW FROM TOPSIDE OF BEARING BOX

WISDOM INDUSTRIES Merino, CO 80741

SCALE: 1"=1'-0"	APPROVED BY:	DRAWN BY: CKW
DATE: 08/04/99		REVISED
DESCRIPTION: SERVICE BULLETIN		
EQUIPMENT: TORNADO		DRAWING NUMBER: 8T 3055B

MAR 18, 2001 - 10:24:44 < L:\TORNADO\8T3055B.DWG >

1	02/28/2001	ADDED WELD DETAIL, CHANGED NOTES FOR CLARITY	SMY

WISDOM INDUSTRIES, Ltd.

SAFETY BULLETIN

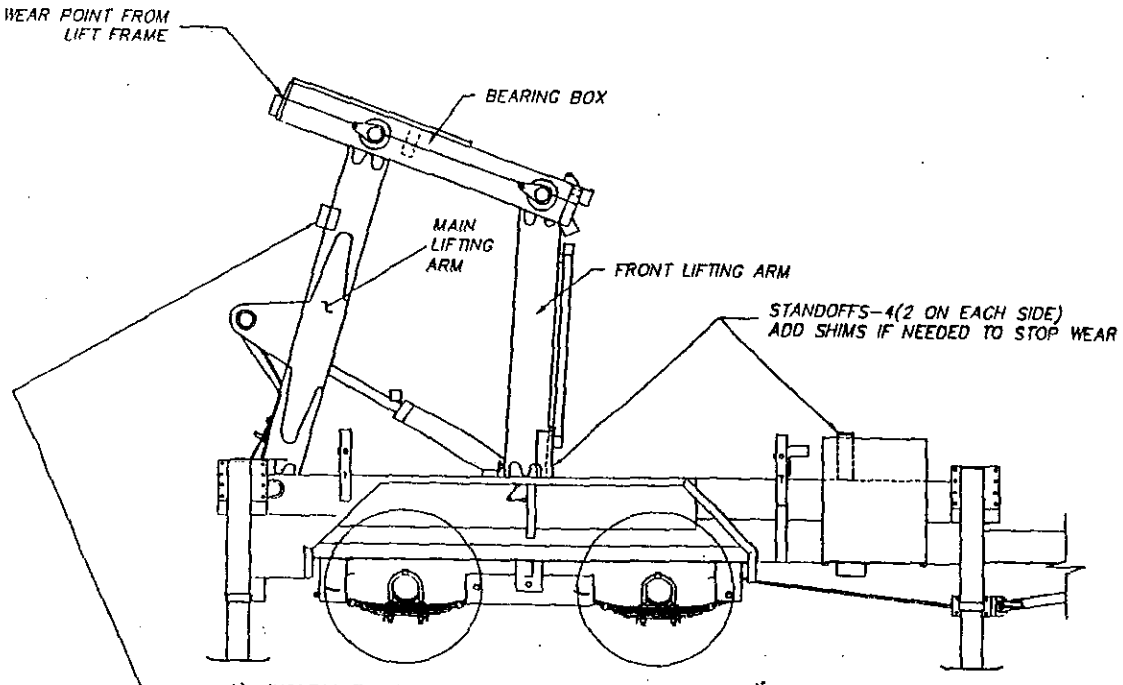
DATE: APRIL 30, 2001
RIDE: TORNADO, WHIRLWIND, SPACE SLED
SUBJECT: MAIN LIFT ARM INSPECTION
COMPLIANCE DATE: IMMEDIATE

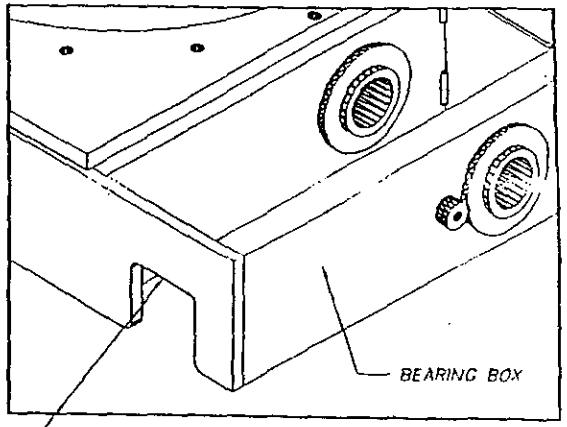
1) Inspect top edge of main lift arm for wear from lower edge of lift frame. (See Drawing)

2) If wear is noted block up standoffs until there is a ½" gap between the arm and lift frame.

3) If the surface of the tube is worn, inspect for cracks in tube and contact Wisdom for repair procedure.

4) Contact Wisdom Industries, Ltd. at (800) 634-6097 if you have any questions.





NOTE: INSPECT TOP AND SIDES OF THE MAIN LIFTING ARM AS THEY PASS THROUGH THIS OPENING FOR WEAR AND CRACKS ON BOTH ARMS.

1) INSPECT TOP EDGE OF LIFTING ARM FOR WEAR FROM LOWER EDGE OF BEARING BOX. IF WEAR IS NOTED INSPECT FOR CRACKS IN TUBE AND CONTACT WISDOM FOR REPAIR PROCEDURE.
2) IF WEAR IS NOTED, BLOCK UP STANDOFFS UNTIL THERE IS ½" GAP BETWEEN THE ARM AND LIFT FRAME.
CONTACT WISDOM INDUSTRIES IF YOU HAVE ANY QUESTIONS.

PASSENGER SIDE RAISED VIEW

WISDOM INDUSTRIES Merino, CO 80741

SCALE: ½"=1'-0"	APPROVED BY:	DRAWN BY: JJR	
DATE: 05/01/01		REVISED	
DESCRIPTION: SERVICE BULLETIN			
EQUIPMENT: TORNADO		DRAWING NUMBER: BT 230	

MAY 01, 2001 - 14:59:47 < L:\TORNADO\BT2305B.DWG >

WISDOM INDUSTRIES, Ltd.

SAFETY ALERT

DATE: March 31, 2003
RIDE: Tornado/Whirlwind/Space Sled
SUBJECT: Check the torque of the main bearing attachment bolts.
COMPLIANCE: IMMEDIATE (TWO STAGES)

Stage 1

- **IMMEDIATELY, CHECK THE MAIN BEARING BOLTS FOR TIGHTNESS;**
  1. Check all main bearing bolt torques.
     a. 5/8 inch bolts torque to 150 foot pounds.
     b. ½ inch bolts torque to 110 pounds.
  2. Loose bolts must be removed, red 262 Locktite added to the threads, and torqued.

Stage 2

- **REPLACE THE MAIN BEARING BOLTS.**
- **BOLT SELECTION**

There have been two different bearings used on the Tornado. One bearing uses 5/8 inch bolts for both sides of the bearing attachment. The other bearing uses both 5/8 inch and ½ inch bolts. All bolts must be at least grade 8 or better.

1. Replace all bearing bolts with new grade 8 or better bolts and case hardened flat washer. Use red 262 Locktite for installation and torque to the above listed rating.
2. Remove old bolt.
3. Install new bolt with a grade 8 hardened flat washer.
4. Apply red 262 Locktite to the treads.
5. Torque the bolt to the above listed rating.

CHECK THE RIDE BOLTS ON A MONTHLY BASIS

REPORT ANY PROBLEMS OR DISCREPANCIES TO WISDOM INDUSTRIES, LTD.

OUTER RACE

.15" HOLES EQUALLY SPACED

$\frac{11}{16}$ DIA. DRILL THRU

⌖ Ø .030

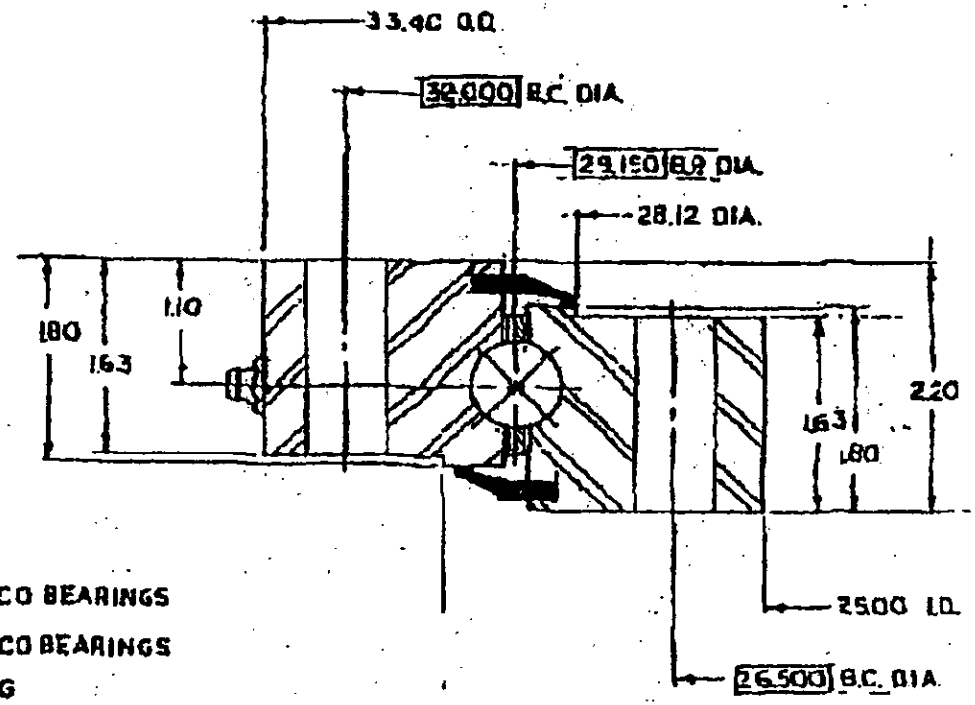
(2) GREASE FITTINGS

INNER RACE

18 HOLES EQUALLY SPACED

$\frac{11}{16}$ DIA DRILL THRU

⌖ Ø .030



NOTES:

1) MATERIAL:
   - RACES — AISI 1532, STEEL, PER SIFCO BEARINGS SPEC # BES 2-1-054
   - BALLS — AISI 52100 STEEL PER SIFCO BEARINGS SPEC # BES 3-1-150
   - CAGE — DELRIN PER SIFCO BEARING SPEC # 3-5-052
   - SEALS — BUNA "N" PER SIFCO BEARINGS SPEC # BES 3-3-015
2) CONTACT ANGLE = 45°
3) THIS BEARING TO CONTAIN (90) .750 DIA. BALLS
4) INTERNAL DIAMETRAL CLEARANCE = .002 – .006 PRIOR TO INSTALLATION

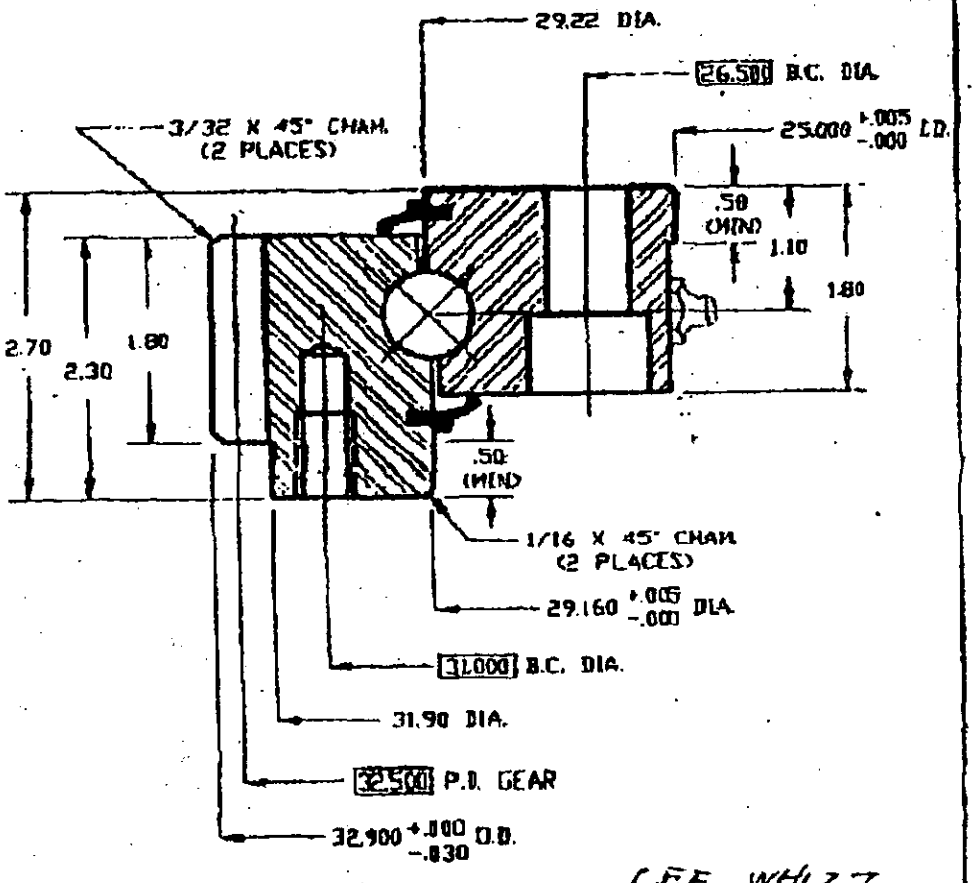
GRAVITRON

TOLERANCES UNLESS OTHERWISE SPECIFIED				SIFCO BEARINGS	
				BEARING ASSEMBLY	
				DATE 12-14-84	PART NO. 729C11
				SCALE FULL	

IMPORTANT: REFER TO SIFCO BEARINGS ENGINEERING DEPARTMENT FOR MOUNTING & CAPACITY INFORMATION

GEAR DATA

TOOTH FORM	INV. STUB
PITCH DIAMETER	32.500
DIAMETRAL PITCH	4
PRESSURE ANGLE	20°
NUMBER OF TEETH	130
ADDENDUM	.2000
DEDENDUM	.2500
HARDNESS	180-250 BHN
DIMENSIONS OVER 4320 DIA. PINS	33.059±.013
CHORDAL TOOTH THICKNESS	.3777-.3677
ABOVE TOOTH THICKNESS WILL PRODUCE	
.015-.025 BACKLASH CUT INTO GEAR	



INNER RACE

18 HOLES EQUALLY SPACED
11/16 DIA. DRILL THRU
1" DIA C'BORE X 11/16 DEEP
⌖ Ø.030 M
(2) GREASE FITTINGS, 180° APART

OUTER RACE

24 HOLES EQUALLY SPACED
1/2-13 UNC-2B TAP X-3/4 DEEP
⌖ Ø.030 M

GEE WHIZ

NOTE:
INTERNAL DIAMETRAL CLEARANCE PRIOR TO INSTALLATION= .004-.008

REV	DESCRIPTION	DATE

UNLESS OTHERWISE SPECIFIED
.XX=±.030
.XXX=±.010
BREAK ALL SHARP EDGES 1/32 X 45°
ANGLES ±1°

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AVON BEARINGS CORP
1500 RANGE RD. AVON, OHIO 44011

BEARING ASSEMBLY

DATE 6-17-92
SCALE FULL
PART NO. 729HA10

IMPORTANT: REFER TO AVON BEARINGS ENGINEERING DEPARTMENT FOR MOUNTING AND CAPACITY INFORMATION