

# NAFLIC

*National Association For Leisure Industry Certification*

## Standards & Related Documents Committee

### TECHNICAL BULLETIN - MARCH 2002

#### 231. iWerks Transporter TurboRide

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We have received a copy of a "Safety Bulletin" from Turner Technical Services, which was written following a Dangerous Occurrence involving an iWerks Transporter TurboRide. This is a Motion Base which suffered a collapse while under test.

The full text of the bulletin is reproduced on the following 3 pages. We have not heard from iWerks directly as to whether they concur with the contents of the "Safety Bulletin".

Committee Members :- Dr Garry Fawcett (Chairman), Mr Richard Barnes, Mr Peter Smith, Mr Ian Grant,  
Mr David Geary, Mr Steve Parker, Mr Eddy Price and Mr Mike Preston

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# SAFETY BULLETIN

## NOTE #1

Turner Technical Services, Ltd and/or Scottish & Newcastle is/are not the manufacturer of this ride. This bulletin is being issued in the interest of assuring safety on any iWERKS Entertainment Transporter Motion Bases or any TurboTour Motion Bases that are currently using cylinders manufactured by Hydro-Line with the Model Number SHR5C-1.5X9.13-N-1 -2M-S-X-X-1-1-X or SHR5C series cylinder that uses a set screw (grub screw) to pin the Rod to the male threaded Stud and the Clevis to the Stud or threaded Rod end.

## NOTE #2

This Bulletin is issued pursuant to the requirements of HSG-175, ASTM F-846, ASTM-F853, ASTM F-893 and ASTM F-1159.

RIDE DESCRIPTION:	iWERKS Transporter TurboRide
SYSTEM NUMBER:	206838
MANUFACTURER:	iWERKS Entertainment, Inc.
DATE OF MANUFACTURE:	April 1999

## REASON FOR RELEASE

On Thursday, 11 October a Transporter Motion Base experienced a failure of one or more cylinders while in Daily Pre-Opening test operation. It was determined by visual inspection that at least one of the Clevis' attached to the Cylinder Rod end had unscrewed and become disengaged from the cylinder assembly. The disengagement caused the Motion Base to become unstable and caused collateral damage to two adjacent cylinders and their attached MOOG 772-280 Servo Valves as well as damage to the MOOG 772-280 Servo Valve attached to the cylinder on which the disengagement occurred. As a result of the failure, hydraulic fluid, under pressure, was discharged into the area adjacent to the Motion Base.

## SUPPORTING INVESTIGATION

The subject cylinders were built by Hydro-Line, Inc, Rockford, Illinois, USA and were installed by iWERKS Entertainment in February 2001 as part of the replacement of seventy two (72) cylinders which were not performing in accordance with iWERKS and Hydro-Line specifications. According to documentation provided by Hydro-Line the referenced cylinder Model Number was to have a means to "PIN ROD to STUD and CLEVIS to STUD" and that "Loctite (was to be applied to secure the) STUD to ROD and CLEVIS to STUD". Examination of the failed cylinders was not able to visually identify any residue from any application of Loctite or similar anti-rotation compound on the STUD or CLEVIS. Examination of the failed cylinders indicated a "wobble" fit of the CLEVIS to the threaded portion of the STUD. Examination of all undamaged cylinders showed that the set screws (grub screws) used to PIN the ROD to STUD and CLEVIS to STUD did not have any visual evidence of Loctite having been applied and could easily be extracted with little or no effort.

It was also determined, during the investigation, that the iWERKS Maintenance Manual provided with the Transporter Motion Base system referenced a Weekly Pre-Opening inspection of the locking ring and safety wire securing the CLEVIS to the ROD. No reference to inspection of the set screws (grub screws) and/or the CLEVIS position was found in any Manuals or Documentation provided by iWERKS Entertainment.

It appears, from the events and evidence examined, that the subject failure most probably occurred as a direct result of a CLEVIS disengaging from the STUD which was attached to the Cylinder ROD. The CLEVIS rotation and subsequent disengagement most probably resulted when the set screw (grub screw) PIN which secured the ROD to STUD and CLEVIS to STUD became disengaged and allowed the Cylinder Rod to rotate during operation and resulted in the unscrewing and ultimate disengagement of the CLEVIS from the STUD.

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## RECOMMENDED ACTION

Immediately examine any iWERKS Transporter Motion Base or TurboRide Motion Base that is using cylinders manufactured by Hydro-Line, Inc.

## NOTE

If the subject cylinders have a locking ring and safety wire attachment or steel roll-pin for securing and preventing rotation of the CLEVIS on the STUD or Rod End continue inspection and operation in accordance with the Manuals provided by iWERKS Entertainment, Inc.

## INSPECTION PROCEDURE

If the subject cylinders use a set screw (grub screw) [typically 8-32] for securing and preventing rotation of the CLEVIS on the STUD or Rod End, the following inspection procedure is recommended:

THE FOLLOWING PROCEDURE IS TO BE FOLLOWED  
DAILY  
UNTIL FURTHER NOTICE

The following work is to be done with the HPU in the OFF and LOCKED-OUT condition.

1. Using a work light (not a torch) that provides good illumination under the Motion Bases, perform the following inspections at each cylinder TOP and CLEVIS:
2. Physically look at each grub screw that secures the CLEVIS to the CYLINDER ROD. The grub screw MUST be FLUSH with the side of the CLEVIS. If the grub screw is NOT FLUSH OR the grub screw is MISSING, the Motion Base IS TO BE TAKEN OUT OF SERVICE until repairs or adjustments are made. See steps #4 to #8 below.
4. If the grub screw is IN PLACE and FLUSH the following inspection MUST be undertaken: Using a ½ inch gauge plate, check to see that the space between the brass collar at the TOP of the cylinder and the BOTTOM of the CLEVIS is ½ inch. If the space is GREATER than ¾ inch, the Motion Base IS TO BE TAKEN OUT OF SERVICE until inspection and, if necessary, repairs or adjustments are made. See step #9 below. If the space is LESS than ¼ inch, the Motion Base can continue to operate and a Calibration should be scheduled as soon as possible.

### START step #2 PROCEDURE 5.

5. If the problems listed in step #2 are present then it will be necessary to place the Motion Base on four (4) jack-stands before performing maintenance or corrective repairs.
6. REMOVE the grub screw from the CLEVIS.
7. With a strong, focused (mini-maglight) light look into the grub screw hole. You should see a smooth polished metal surface. If you see threads from the ROD the CLEVIS may have become UNCREWED and the cylinder may need to be removed to complete the required servicing. Proceed to step #7 before making a decision to remove the cylinder.
8. Using a smooth jawed wrench or spanner, grasp the flats of the ROD END. Turn the wrench or spanner ANTI-CLOCKWISE slowly and look through the grub screw hole. When you see a hole appear opposite the grub screw hole STOP turning the ROD END. Carefully align the CLEVIS grub screw hole with the ROD END hole.
9. Dip the pointed end of the grub screw in blue loctite to cover approximately ½ of the grub screw threads. Insert the grub screw and tighten it so that it is fully flush with the side of the CLEVIS.

### END step #2 PROCEDURE

### START step #3 PROCEDURE

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10. Perform a calibration on the Motion Base, using the calibration procedure, to reset the proper spacing between the TOP of the brass collar on the cylinder and the BOTTOM of the CLEVIS. This calibration can be conducted following or preceding the opening of the show to the public. The Motion Base may be used if required as long as the grub screw is installed and FLUSH with the surface of the CLEVIS.
20. If it is not possible to align the grub screw hole with the hole in the ROD END then it will be necessary to remove the cylinder and the pillow blocks for further inspection and repair. If this condition exists IMMEDIATELY notify IWERKS Entertainment and/or their authorized technical representative and wait for further instructions BEFORE attempting any repairs or maintenance.

## SPECIAL NOTE SAFETY PROCEDURE-MOTION BASE INSPECTION-HPU ON

The following procedure is to be used whenever anyone inspects a Motion Base while the Motion Base is ENABLED and the HPU Pumps are ON.

1. Place the Show Control selector switch in the OFF position.
2. On the Motion Control PRESS FI and go to LOAD show.
3. On the Motion Control select the BLANK show at the end of the shows list.
4. Make sure that there is NO SHOW listed in the CURRENT SHOW display at the bottom of the Motion Control screen.
5. Perform the inspection using CARE and CAUTION
6. At the completion of the inspection RESET the show to the correct one to match the queue sequence.
7. At the completion of the inspection RESET the Show Control to REMOTE and make sure the system is ready to go in the normal show sequence.

### SPECIAL NOTE:

The above procedure is **ONLY** to be used when performing an under Motion Base inspection with the HPU **ON**.

## WARNING

**Performing an inspection under a Motion Base with the HPU ON and the Motion Base ENABLED is not to be done unless a safety observer is present and positioned close to the "E" STOP button.**

The safest way to inspect a Motion Base is with the HPU OFF and LOCKED OUT. When performing the HPU OFF inspection, it is REQUIRED that the Motion Base or Bases to be inspected are NOT ENABLED during the inspection.

Once the inspection is completed, the Motion Base / Bases can be ENABLED and the HPU turned ON.