TILT-A-WHIRL®

Amusement Ride

OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released September 1978 — Memo #001

Place this Memo in your Manual and **inform your staff immediately** of this Memo.

SUBJECT: TILT-A-WHIRL CAR MAINTENANCE INSPECTION

To insure proper operation and longer life for the Tilt-A-Whirl Cars, they must be maintained, inspected, and lubricated at the proper intervals as outlined in the Lubrication Chart on Page 38 of the Tilt-A-Whirl Service Manual. Operators must be familiar with "Problems" described under TROUBLESHOOTING on page 43 and with Section 3 OPERATION AND MAINTENANCE on Page 33 of the Service Manual.

To properly inspect the Tilt-A-Whirl Car, it should be removed and placed on its back. First, remove the car top. Then remove the Pivot Pin Cap, Cotter Pin, Lock Pin, Threaded Washer, and the Small Fiber Washer. These parts should be cleaned and inspected for wear at this time. Using **Three** men, lift the Tilt-A-Whirl car **Straight Up** from the Platform Pivot Pin. Failure to lift straight up will result in bending the Car Flange Steel Floor Plate, and will cause premature wear out of the #346-B Car Pivot Flange Bushing. At this time inspect the Large Fiber Washer and the Platform Pivot Flange and Pin for wear and appearance.

When placing the car on its back, care should be taken to protect the finish and decals. A Car Night Cover, or old blanket should be placed underneath; the car. While in this position, on its back with the car tongue pointing up, the car can be propped up. What works well is to set the back of the car apron on a 5 gallon pail or something similar.

While viewing the under-side of the car, inspect for broken welds, loose fasteners, rust, and appearance.

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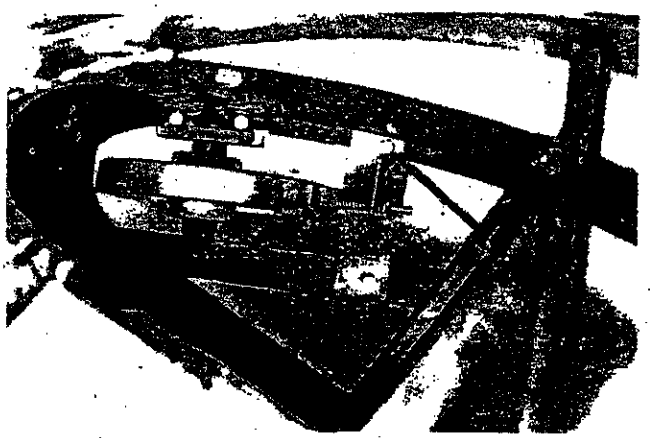
Clean the electric brake Armature Plate and insure the cleanliness of adjacent parts. Make sure the springs are not broken, that the studs are not bend over or ballooned, and that there is no evidence of unusual wear.



Clean and inspect the Car Pivot Flange and check flange bushing for wear. If worn the bushing can be pressed out and a new bushing pressed in. Replace Car Pivot Flange bushing when worn past 1⅝" inside diameter. Replace Platform Pivot Flange when pivot point is worn under 1⅜".

Inspect the #349 Seat Handle Bar to be sure that it is properly fastened in place. Check the action of the car brakes by operating the Seat Handle Bar. Clean and oil all the pivot points including the point where the seat handle bar attaches to the Handle Bar Holder. Check to see that brake shoes and pads are concentric with the wheels. If brake shoes and/or linings are worn they should be replaced. It is important that the brake shoe be properly adjusted and is effective when the ride is in operation.

Check the Car Wheel Bearing to see that they turn without difficulty and that the axle is pinned in place properly with a 3/16 x 1¼ Cotter Pin. If the axle is allowed to rotate it may be worn off and cause the wheel to fall.

To re-install the Tilt-A-Whirl Car, first place a Large Fiber Washer over the Platform Pivot Pin. At this time a coating of grease should be wiped on the pivot pin. The car is then lowered **Straight Down** over the pivot pin. The Small Fiber Washer and the Threaded Washer go on next, then the Lock Pin, is placed through the Pivot Pin and held in place with a 5/32 x 1" Cotter Pin, which is spread with a pliers so that it cannot be removed by hand. After a final inspection of the Lock Pin is made the Pivot Pin Cap can then be screwed on.

The Car Top is then re-installed. Examine the Car Top Hook to see that the Hook Spring has enough tension to hold the Car Top in place. Make sure car rolls freely when mechanical and electrical brakes are off.

Inspect the overall appearance of the Car. Make sure that the Car Floor is clean and free of grease which may end up on the customers clothing.

Check car interior and sheet metal screws in bottom panel so that there exists no sharp edges or places that may snag the customers clothing.

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Released September 1978 — Memo #002

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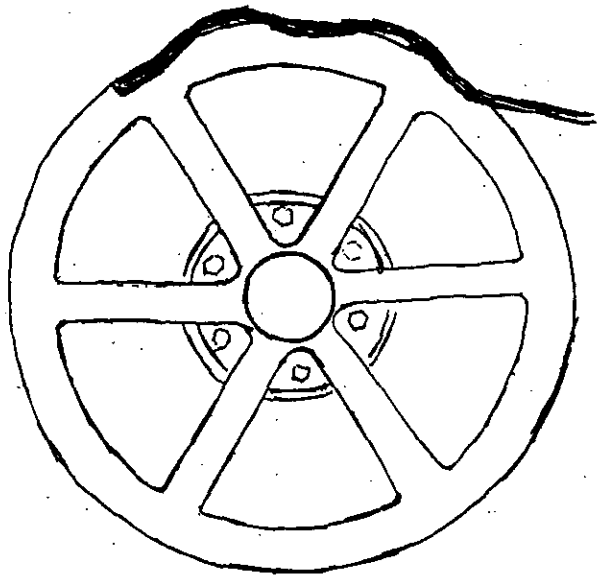
SUBJECT: RUBBER DRIVE SHEAVE PACKING PROBLEMS
INSTALLATION AND OPERATION



The Rubber Drive Sheave Packing is a one piece strip of square shaped rubber packed around the drive sheave. Proper installation: First remove old packing and clean groove in drive sheave. **Do not** use glue or soap on packing to make it easy to insert into groove. Take a ½" thick metal bar or use our packing tool (Part #13-T) and plant one end of the packing into the groove. Then make a hump in the placking by skipping over 6" to 12" of packing and pounding the packing almost to the bottom of the groove. Leave enough room for air to escape under the hump. Then pound the hump down. This expands the rubber packing in the groove making a tight fit. Continue humping and pounding around the entire circumference of the sheve. This should leave only a small amount of material to be cut off.

Proper Operation: Operate the Tilt-A-Whirl without a load for 10 to 15 minutes to further seat the newly installed rubber packing in the drive sheave. Many problems with the packing can be caused by improper operation of the Tilt-A-Whirl. Using the parking brake to add thrills to the Tilt-A-Whirl ride by braking the Tilt-A-Whirl while it is turning full speed can easily strip the packing from the drive sheave. When stopping the ride, allow the Tilt-A-Whirl to come almost to a complete stop before using the parking brake. A frayed or dirty cable will prematurely wear out the packing. Do not use pine tar on your cable as it quickly becomes coated with grit. Morning dew will condense on the drive cable causing the cable to slip through the drive sheave. It may be necessary to wipe the cable and packings off, before the Tilt-A-Whirl can be operated.

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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released September 1978 — Memo #003

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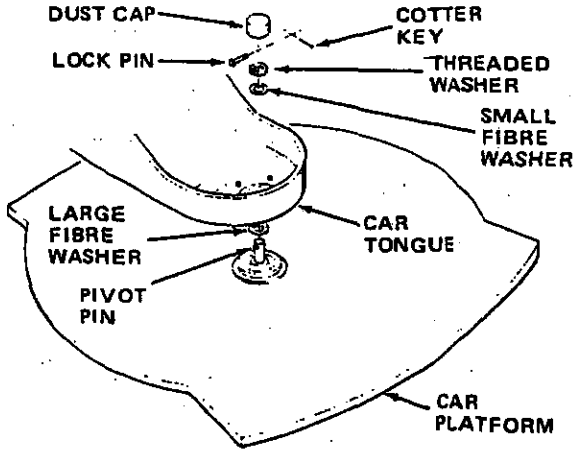
SUBJECT: ABUSE OF #253-E TILT-A-WHIRL CAR LOCK PIN

The #253-E Lock Pin should always be retained with a cotter pin, dimensions 5/32 x 1", that has to be spread with a pliers. **DO NOT** use a hair pin type cotter that can be removed by hand. We have knowledge of many situations where the safety retaining systems of the Tilt-A-Whirl pivot pin have been vandalized by the Tilt-A-Whirl patrons. Where the individual passenger will reach down and intentionally unscrew the pivot pin cap and try to remove the lock pin.



The appropriate safety measure is to use a cotter pin which has to be spread with a pliers and cannot be removed by hand. The Tilt-A-Whirl operator should also inspect the condition of these components at least on a daily basis, if not more frequently. If the cotter pin or any other part of the assembly shows excessive wear, they should be replaced prior to continuing operation.

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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released September 1978 — Memo #004

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SUBJECT: GENERAL INSPECTION GUIDELINE OF POINTS TO BE CHECKED DAILY BEFORE START OF EACH DAY'S OPERATION.

Check car pivot flange lock pin located under pivot cap to assure that cotter key is in and spread.

Check that cotter keys are in seat handle of car and spread.

Check that hold-down hooks on car domes are secure.

Check platform hinges for worn or loose mounting and hinge bolts.

Check that clevis pins on sweeps are in and pinned.

Check sidewalk sections for proper placement and that they are secured with safety keys.

Check that handrails and locking light post angles are secure.

Check steps and rails for proper placement and adjustment.

Check motor guard fence for proper placement and that all enclosure panels are secure.

Check drive cable for proper tension and general condition.

Check cable packing blocks for wear.

Check drive sheave packing for condition and wear.

Check tightener sheave tension. Do not pack the tightener sheave with rubber packing.

Check track, trolley and platform pins for wear and proper safety key installation.

Check condition of trolley wheels, alignment on the track and that the wheel axle is fixed with cotter pin.

Check condition of car wheels.

Check electrical and mechanical brakes for proper operation.

Check that clutch angle iron braces and turnbuckles are in place.

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Proper blocking is achieved by splice blocking and quarter blocking under the track section.

Check wiring connectors and electrical cable layout around ride.

Check ride for proper lubrication. See Tilt-A-Whirl Lubrication Chart.

Sidewalk and platforms should be kept free of grease, oil and debris.

Make sure chains are attached across exits and entrance to prevent anyone from entering the ride while ride is in motion.

Entire area around ride should be kept free of any obstacles which could cause injury to persons.

WHEN RIDE IS RUNNING:

Check that trolleys are tracking properly.

Check that the cable is engaging the cable forks properly and the cable is entering and leaving the sheaves without binding.

Check that the drive belt (triple V-Belt), is in alignment.

Check that the clutch brake is holding the ride.

Proper operating RPM is 6½. Ride should be operated to start and stop smoothly. Fast starts and stops reflect improper operation.

Persons should not stand on or near traveling platforms when ride is in motion.

Under NO circumstances should the ride be operated with anyone under or inside the center of the Tilt-A-Whirl. All enclosure panels and engine guards should be in place when the Tilt-A-Whirl is operated.

TILT-A-WHIRL®
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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

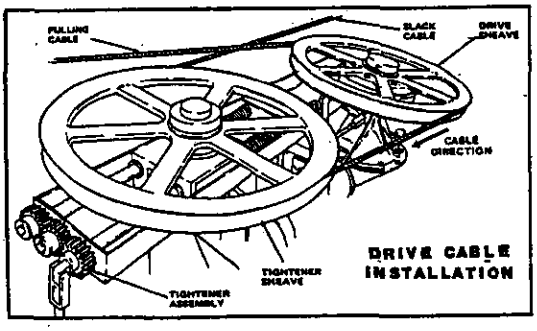
Released March 1979 — Memo #005
Page 1 of 1

Place this Memo in your Manual and ***inform your staff immediately*** *of this Memo.*

SUBJECT: DRIVE CABLE
INSTALLATION, MAINTENANCE AND PROBLEMS

Proper attention to installation and maintenance of the Tilt-A-Whirl Drive Cable will greatly increase the life of the Tilt-A-Whirl and insures Tilt-A-Whirl profits. When installing a Tilt-A-Whirl drive cable:

WARNING:
Make sure power is locked off when working in and around Tilt-A-Whirl drive. Lay the cable in a circle around the Tilt-A-Whirl platforms. Care should be taken that no kinking or severe bending occurs as the cable is unfolded. The cable should be kept as clean and dry as possible. Inspect all cable fork packing blocks and replace any that have been worn through. Inspect the drive sheave packing and replace if necessary.



DRIVE CABLE INSTALLATION

If any problems have been noticed such as excess wear, bent sweeps, etc. . . . solve these problems before they ruin a new drive cable. If everything checks out okay start dropping the cable down into the cable forks. Work your way around the ride to the power transmission unit. Leave the cable out of a couple of cable forks to make it easier to thread through transmission unit. Loop the cable around the tightener sheave *and through the drive sheave and out over itself. The drive sheave pulls* the cable from the ride, the slack cable is fed under and back onto the ride. (See diagram) Place the cable into the rest of the cable forks and draw up the tightener sheave till the cable is tight but still can be lifted from a cable fork packing with a hard tug.

The ride should now be run for 15 to 30 minutes without a load to properly seat the wire strands in the cable splice and to seat the cable fork and drive sheave packings. After this break-in period all the packing should be checked and the cable tension adjusted. A new cable will fit tight and will stretch out in time. The cable tension should be backed off after daily operation to prohibit over stretching as the cable cools down. Remember to retighten the cable the next day. A new cable will wear up to ⅛" off the cable for packing blocks until it becomes impregnated with the polyurethane compound. The Tilt-A-Whirl drive cable should be kept as clean and dry as possible. The cable can be cleaned by wiping with kerosene or light weight oil. If the cable is very dirty soak the cable in kerosene over night and wipe dry. The drive cable should be inspected periodically for loose or broken strands.

Morning dew will cause the cable to slip through the packing blocks. Loosen the cable and wipe it dry, retighten and try running the ride again.

Use of Pine Tar is not recommended on the Tilt-A-Whirl cable as it tends to attract dirt and act as an abrasive on the packings.

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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released March 1979 — Memo #006
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SUBJECT: DRIVE SHEAVE PROBLEMS

Tilt-A-Whirl Drive Sheave wear problems are caused by:

1. Power transmission unit not properly in alignment with Tilt-A-Whirl track: the clutch and track must be operating in the same plain.

2. Sprung or worn out parts: the support angles from the clutch frame to the track section hold the clutch an exact distance from the Tilt-A-Whirl track. If the pin holes are worn, the frame will tip into the ride causing misalignment. The clutch track section may be sprung or straightened out as evidenced by the trolley wheel running close or off the outside edge — this allows the clutch frame to fall out of alignment. A pattern and truss is available from the factory to reform and reinforce this track section. This problem is caused by over tightening the turnbuckles on the clutch frame. Bent or worn sweeps and cable forks, trolley wheels of different sizes all can cause alignment problems.

3. Improper blocking of center hub. The Tilt-A-Whirl is usually leveled by lifting the track up to level. Many times the center hub will be left floating in mid-air without blocking tight underneath. When the cars and platforms are put on, the center drops and brings the sweep end up out of alignment with the clutch. When the track assembly is completed recheck the level, the pinning, and **all** the blocking.

4. The Tilt-A-Whirl transmission unit is matched at the factory to the track. If for any reason a clutch unit from a different Tilt-A-Whirl track is used on your track look for alignment problems.

5. Check the drive sheave itself for damage and position on the drive shaft. The sheave should be flush with the end of the shaft and secure on the shaft. Make sure that no drive sheave packing is used in the tightenter sheave as it will fill the **guide** groove.

6. Is your operator sabotaging your profits by trying to make a heavy thrill ride out of our top earning family ride? The Tilt-A-Whirl is designed so that the cars will spin naturally. If the mechanical end (wheels, bearings, spindles) are cared for, the Tilt-A-Whirl will practically run itself. Between 6¼ and 6½ R.P.M., the cars should be very active. When overspeeded the cars will hang on the outside and do nothing for your customers. Bring the Tilt-A-Whirl up to speed and leave it. If your Tilt-A-Whirl runs too fast, buy a slightly smaller electric motor pulley, too slow buy a larger one. The best thing you can do is have your operator conscious of the right speed for a Tilt-A-Whirl and then have him or her watch for safety and not for spins. The clutch brake is an emergency and parking brake. The brake is not designed to be used to continually slow the ride from full speed. Declutch the transmission unit and allow the Tilt-A-Whirl to slow considerably before using the brake to bring the Tilt-A-Whirl to a stop.

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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released April 1979 — Memo 007
Page 1 of 1

Place this Memo in your Manual and **inform you staff immediately** of this Memo.

TO ALL TILT-A-WHIRL Owners and Amusement Ride Safety Inspectors.

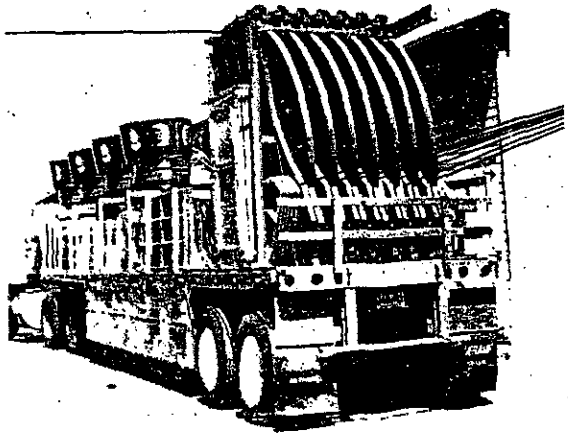
SUBJECT: LOADING AND TRANSPORTING OF TILT-A-WHIRL ON TRAILERS WHERE THE PLATFORM PIVOT FLANGE PIN PROTRUDES THROUGH THE INTERMEDIATE PLATFORM.

Special attention should be given to the #253 Platform Pivot Flange on Tilt-A-Whirl's where the Transport Trailer requires the intermediate platform to be loaded with the pivot pin on the car platform protruding through it (non-factory trailers). The flange and pin were not designed to withstand the road shock subjected to it by carrying an intermediate platform.

The Tilt-A-Whirl Intermediate Platform comes from the factory with steel blocks welded to its top to space the intermediate platform away from the car platform. Make sure these blocks are in place.

When unloading and loading the Tilt-A-Whirl, there must be an intermediate platform stacked in between each car platform. (See photo.) When unloading the Tilt-A-Whirl remember to send the first intermediate platform around the Tilt-A-Whirl on top of the first car platform, as it will be the last to be set in place. When loading remember to save that intermediate platform by again setting it on top of the adjacent car platform, till all the other platforms have been removed. This way you will not have a car platform riding on the pivot pin. The Tilt-A-Whirl transport trailer should have a safety chain and hook which secures the unloaded platforms. If your trailer does not have a safety chain they are available from the factory. Order part #TR-35 Platform Loading Safety Chain.

The condition of the platform pivot flange and fasteners should be inspected on a regular basis. If any play is found between the pin and the flange, the flange should be replaced immediately.



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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released January 1981 MEMO #008

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Subject: Wear and repair of select Tilt-A-Whirl components.

#150-60 TILT-A-WHIRL
CENTER HUB AND COMMUTATOR ASSEMBLY

Part Number	Description	New Measurement	Repair or Replace When Worn To
#163-61	Center Shaft	3" (2.996)	
#161-61	Bronze Bushings, Pair	O.D. 3½ I.D. 3.025	
#160-C	Sweep Clevis	1.447	3/8" End Play
#166-C	Sweep Pins	3/4"	11/16"
#170-T & B	Flange Pins	5/8"	1/2"

The #150-60 Center Hub with 3" hollow shaft replaces the "Old Style" #150 Hub with 2" solid shaft. The change allowed use of a top mounted enclosed commutator needed with the electrical brake system and modern electrical codes.

The #163-61 Center Shaft rarely shows wear, but if worn must be replaced entirely.

The #158-61 rotating Center Hub has two #161-61 Bronze Bushings pressed into it from top and bottom. They are set flush with the hub casting with a 2½" grease cavity between them. When worn these bushings can be pressed out and replaced with new. Line up the grease hole in the top bushing. The bottom bushing has a grease channel.

The #T-302 Hub Thrust Bearing should rotate freely. Clean and re-lubricate, replace if necessary.

The #170-T and #170-B Top and Bottom Flange Studs should be tight and straight in the castings.

The #160-C Sweep Clevis should be checked for wear and breakage. They can be replaced with new clevises with oversize spindles # 160-B available in 1-9/16" and 1-5/8" sizes. The rotating hub must be line bored out to .005" larger than the oversize clevis and any "eyebrow" should be removed from the face of the hub and built back with large washers. It is recommended that the entire hub and clevis assembly be replaced with new. The worn hub should be sent to the factory for possible rebuilding. The Sweep Clevis opening where the sweep channels fit into should not exceed 1-3/4".

The #185 Commutator Assembly is designed for long life and little maintenance. We find that many operators will over grease the center hub bearings and start to fill the commutator can with lube. A good cleaning check-over and possibly new brushes is all that should be needed.

The #166-C Sweep Pin should be removed and checked for wear periodically. In the permanent installation, 2 to 3 times per season. The Sweep Channel should be blocked up and the pin removed. If worn replace, if not wipe the pin with grease or anti-siese compound before repinning the sweep. Lubricate daily with 30 weight oil.

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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released January 1981 MEMO #009

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Subject: Wear and repair of select Tilt-A-Whirl components.

PLATFORMS, SWEEPS, TROLLEYS, TROLLEY TRACK AND SPOKES

Part Number	Description	New Measurement	Repair or Replace When Worn To
#200	Sweep Channel, Clevis Holes	3/4"	7/8"
#221	Steel Trolley Wheels	10⅜" to 10¼"	9¾"
#221-PU	Polyurethane Trolley Wheels	10-3/16"	Cap Failure
#255	Hinge Bolt	3/4"	5/8"
#253-61	Platform Pivot Flange	1-33/64"	1-7/16"
#55	Track Pin	1/2"	7/16"

The #200 Sweep Channel should be reasonably straight with no broken out or cracked pin holes. Damaged sweeps should be replaced. If worn the clevis hole can be filled and re-drilled. The 3/4" hole is located 1" from the sweep end in the center of the channel. Part #205 Sweep End Plates are available from the factory for repair of badly worn sweeps.

The #201 Cable Forks should be replaced and corrective action taken if the cable has missed the #201-PU Cable Fork Packing Block and cut into the shoe. See Maintenance Memo #005 Drive Cable Problems. It is recommended that all the shoes with any wear in the wrong spot be replaced as once the cable has started to wear the shoe in the wrong spot it will continue to find that spot until it has cut the shoe in half.

The #100 Trolley Track has twelve splices which should be watched for wear. If the #55 Track Pin hole 1/2" is worn 1/16 of an inch the next oversize track pin #55-B of 9/16" should be installed. The factory carries oversize track pins out to 3/4". Often it is best to increase the pin size two sizes to eliminate any wear on all the pin holes. The track and spokes should be checked for sprung and broken sections. #113 Clutch Section should be trussed to counter the pull of the clutch unit. The trolley wheel should not run off the track.

The #221 Steel Trolley Wheel or the new #221-PU Polyurethane capped Trolley Wheels should be checked for size and condition. Any cracked or chipped wheels should be replaced. Bearings should be quiet and smooth running. Be sure the axle is **pinned** so it cannot turn inside the holder. Use a 1/4" x 2" Cotter Pin to hold the axle in place.

Check the #220 Trolley Frame for pin hole wear and straightness. Make sure the sweep clips have not been bent or removed.

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The #250 Car Platform and #280 Intermediate Platform have been built of steel tubing and four-way plate since 1966. Wood Platforms develop fastener problems with the pivot flange and the hinges. The fasteners on the Steel Platforms do not have as much trouble, but should be checked. The Platform Hinges #254 and #282 should be checked for wear in the form of gouging between the hook and the eye. Wear up to 1/4" can be corrected with washers. The hinge should be replaced if worn more than that. Grade #5 bolts should be used. The #255 Hinge Bolt Nut should be secured with a cotter pin and should be replaced if worn.

Special attention should be given the #253-61 Platform Pivot Flange. The cast flange should show no damage. Replace with new flange immediately if chipped, cracked, or if there is any sign of a loose pivot pin. All the fasteners to the platform should be tight and in top condition. Use Grade #5 bolts. The fiber washers #267 and #268 the Lock Pin #253-E Threaded Washer #253-D and Cap #253-F should be in top condition. If worn they should be replaced with new. A cotter pin 5/32" x 1" should be spread with a pliers to secure the lock pin. See Maintenance Memo #003 of September 1978 and #007 of April 1979.

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Subject: Wear and repair of select Tilt-A-Whirl components.

#1 POWER TRANSMISSION UNIT

When working on the Tilt-A-Whirl Power Transmission Unit you should check the condition of components. The #52 Brake Band or the #4 Sliding Sleeve Ring. The operator should receive some training in how a friction block clutch works and understand how the clutch handle pushes the #3 Sliding Sleeve "over center" and into gear. The clutch should be adjusted so that there is clearly three positions: Drive, Neutral, Park. Of the three positions the neutral is probably the most important because it allows the Tilt-A-Whirl to slow down by itself saving the brake for its intended use as a parking brake.

HOW TO ADJUST A TILT-A-WHIRL CLUTCH

Before working on the Tilt-A-Whirl drive, the power should be turned off and locked out. NOTE: The Electric Motor driven Tilt-A-Whirl should be equipped with a magnetic style contactor with the stop button in easy reach of the operator's station. The gas engine should have an accessible kill switch. Throttle adjustment should be **only** varied by the engine's governor, NO "G" Strings.

When new, the #7 Wood Clutch Blocks and the #52 Brake Band will require a break-in period and re-adjustment. Excessive moisture will swell the Wood Clutch Blocks and require re-adjustment.

The new clutch unit comes from the factory with approximately 1/4" of space between the #3 Sliding Sleeve and the #9-C Pillow Block and 1⅝" between the #2 Drive Yoke and #3 Sliding Sleeve in disengaged condition. The #2 Drive Yoke is set in flush with the key slot in the clutch shaft on the #3 Sliding Sleeve. Make sure that the #2 and #3 are positioned on the shaft in the right direction.

The brake should be adjusted first. You should be able to stall the ride using the brake. In an emergency the operator should be able to stop the ride within one revolution.

The Wood Clutch Blocks are tightened down until in contact with the #C-47 Friction Pulley. Again allow for break-in period with new clutch blocks. When in neutral position there should be no chatter or friction or grabbing between the blocks and the friction pulley. The #7 Blocks should fall very close to the center of the friction pulley. If the #7 Wood Clutch Blocks are wearing unevenly, the #2 Drive Yoke could be positioned wrong on the Clutch Shaft. The Clutch Shaft and U Joint Yoke are positioned close up to the #9-C Pillow Block.

THE REPAIR of the clutch assembly is not difficult, as most of the parts are easily accessible. The #4 Sliding Sleeve Ring and the #3 Sliding Sleeve should be checked for wear. The #4 is made out of brass and will wear out eventually. The new #4 measures 7/8" and should be replaced when worn to 5/8". The #3 should be replaced when the groove is worn to 1".

The #7 Wood Clutch Blocks will also wear out in time. When new they require a break in period and will have to be readjusted. The #28 Clutch Adjusting Links should be in good condition and have the locking nut in place.

(continued on other side)

If you need more information contact: **Toll Free 800/533-0390**
SELLNER MFG. CO., INC.
P. O. Box 8, Faribault, MN 55021

TILT-A-WHIRL®
Amusement Ride

OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released January 1981 MEMO #010

Place this Memo in your Manual and **inform your staff immediately** of this Memo.

The bearings under the #P-47 V Belt Pulley and the #C-47 Friction Pulley are adjusted by a threaded collar #1-L and #1-M on the clutch shaft. There should not be any play in this bearing assembly.

The #9-C Pillow Blocks and the Universal Joint Spider should also be checked for bearing problems.

The #20-50 Reduction Gear Unit requires little care. Normally, if the #140 weight gear lube level is maintained and the needle bearing is kept lubricated, that is all the maintenance needed. If a broken shaft should happen, the factory has fresh gear units ready to ship on an exchange basis. This often proves a faster repair than working on the old unit in the field. The 1950 to 1973 model Tilt-A-Whirl's used 7 tooth pinions and 36 tooth ring gears. Some 1974 to 1976 Tilt-A-Whirl's used 6 tooth pinions and 40 tooth ring gears.

The #14-50 Drive Sheave should always be run with a rubber packing. If worn so it will no longer hold a packing, it should be replaced. See Maintenance Memo #006 March 1979 Drive Sheave Problems.

The Clutch Brake Assembly is fastened to the shifting handle through a series of clevis and blocks and is fully adjustable. The #52 Brake Band should have ample brake lining material around the entire inside of the band. The brake band and other components should be in a condition so that positive braking and adjustments can be achieved.

The Tightener Base Assembly requires good lubrication and little else. Examine the #41-A Compressions Springs to make sure they are not broken. Check the #10 Tightener Base for proper motion on the #38-A and B Slide Rods. The #11 Tightener Sheave Bearings should have very little play. An old and stretched Drive Cable will not allow any take up on the Tightener Base and may fall from the transmission unit causing problems. The cable should be replaced. See Maintenance Memo #005 Drive Cable Installation, Maintenance and Problems.

If you need more information contact: **Toll Free 800-533-0390**
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TILT-A-WHIRL®

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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

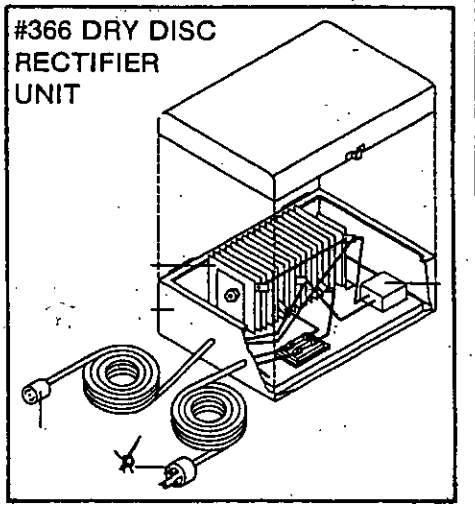
Released April 1981 MEMO #11

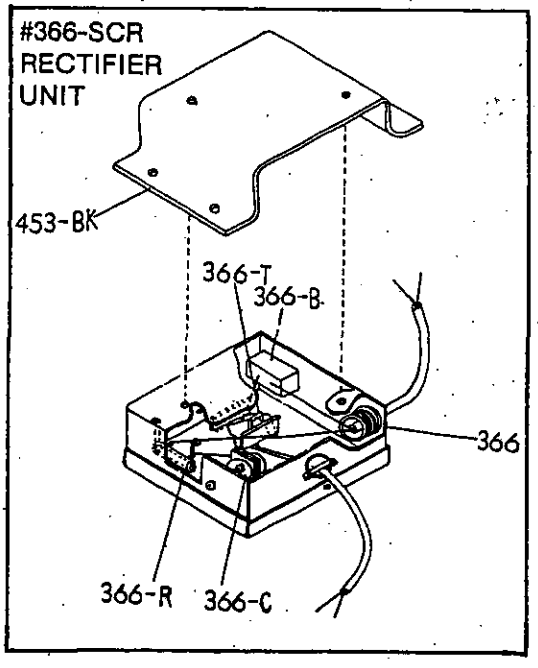
Place this Memo in your Manual and **inform your staff immediately** of this Memo.

SUBJECT: TILT-A-WHIRL ELECTRIC CAR BRAKE SYSTEMS

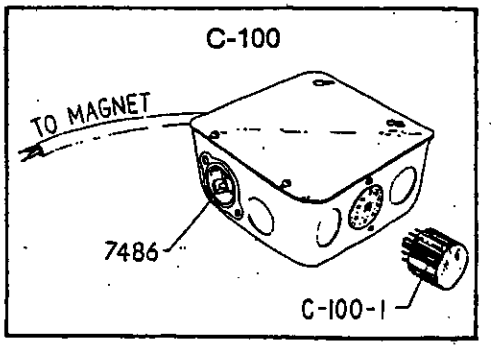
1961 and newer Model Tilt-A-Whirl's are factory equipped with an Operator Controlled Electric Car Braking System. 1961 to 1970 systems used a dry disc rectifier mounted next to the operator's platform. 1970 to present Tilt-A-Whirl's use a small bridge rectifier mounted in a box under the car platform pivot flange or a plug-in module under the car platform.

The #366 Dry Disc Rectifier was made obsolete in 1971 through the use of the smaller more efficient plastic semi-conductor bridge rectifiers. The dry disc rectifier was prone to moisture problems with outdoor use and the commutating and connecting of the D.C. output caused considerable problems with corrosion and arcing. The large selenium rectifiers have become unavailable, so we have discontinued supply of parts to this old style rectifier system and have conversion units available to a newer system.





The #366-SCR Rectifier unit eliminated much of the problems with cord and connectors and D.C. electricity. The 110 VAC is rectified directly under the car pivot flange with a very short run for the 90 volts D.C. to the electromagnet.



The 366-SCR is protected with a 1/2 amp circuit breaker on the line side. A small selenium rectifier is wired across the D.C. side to protect the bridge rectifier from fly-back voltage from the electromagnet. If the magnet terminals are shorted to ground the 1/2 amp breaker will burn out and also the bridge rectifier will be damaged.

(See other side)

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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released April 1981 MEMO #11

Place this Memo in your Manual and **inform your staff immediately** of this Memo.

SUBJECT: TILT-A-WHIRL ELECTRIC CAR BRAKE SYSTEMS

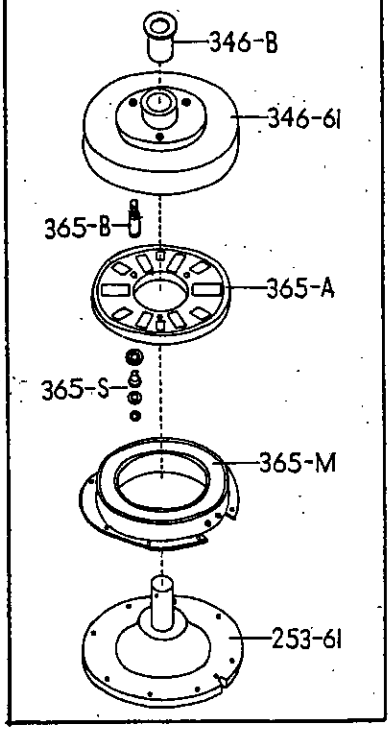
The moving plate is spring loaded on three studs to the bottom of the Tilt-A-Whirl car pivot flange. If the studs are bent, ballooned, or dirty, the armature plate is stuck and the brakes won't work. Clean the assembly with a degreaser, replace any worn or bent studs, lubricate only the studs and make sure the springs are properly in place.

The armature plate sould move freely against the springs on the studs.

The #C-100 modular brake system has no repair. Just make sure that the electromagnet is good and the wiring clear of shorts before introducing a new module to the circuit.

The electric car brake system should be turned off after hours so that the magnet coils and rectifier unit do not heat up.

PIVOT FLANGE AND MAGNET ASSEMBLY



If you need more information contact:

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Trouble Shooting. The 346-B Car Pivot Flange Bushing should be replaced if worn out more than 1⅝" inside diameter. Wear in the bushing may allow the car pivot flange to cut into the magnet terminals shorting them out. If the car flange floor plate is bent it causes the bushing to wear out prematurely and allows the flange to cut into the magnet terminals. The plate should be straightened and a new bushing installed.

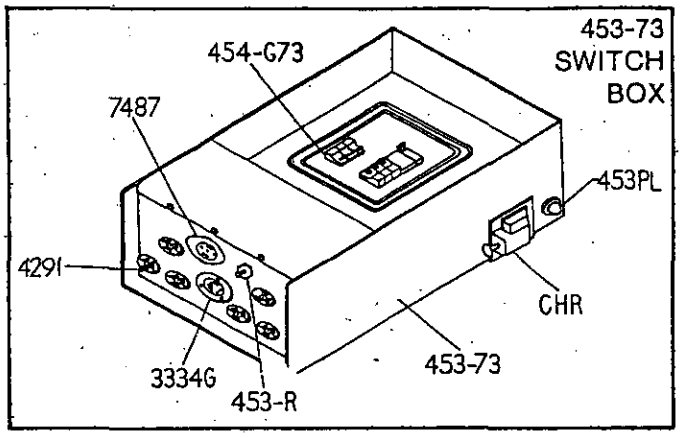
1971 and newer systems. If the electric car brakes fail to accuate when the switch is thrown you must trace through the system to find the problem or problems.

The system is connected to the Tilt-A-Whirl switch box with a 5 amp circuit breaker and a on/off switch in line.

First check for 110 VAC from the Switch Box brake system outlet #7487.

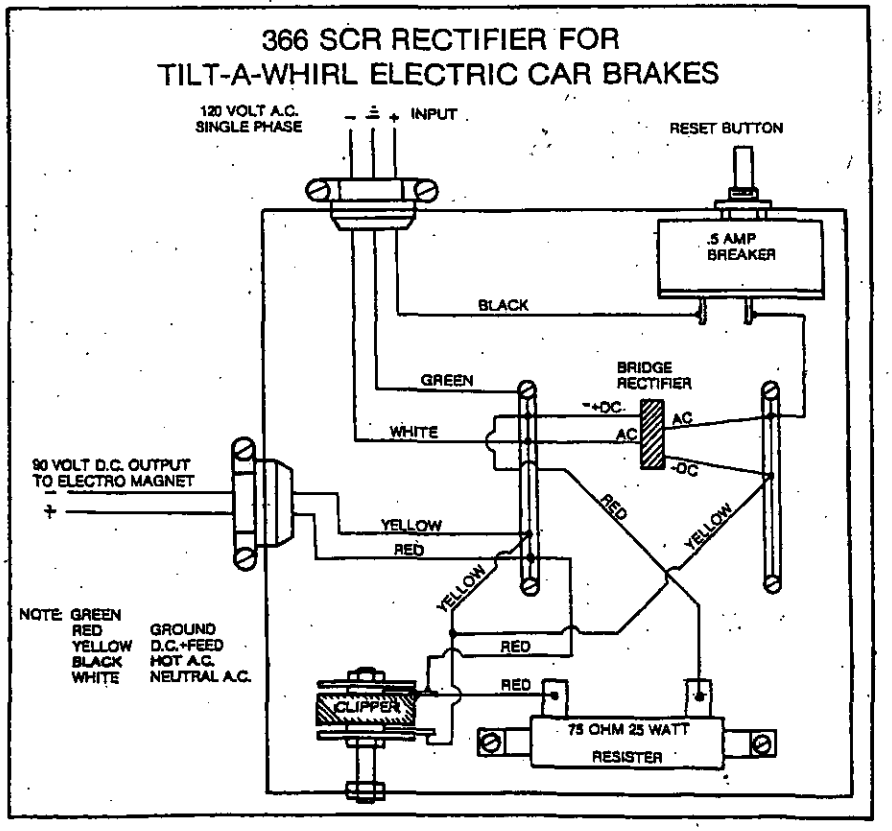
The fluorescent light system switch #453-73 box is wired for 110 VAC operation. The running incandescent light system switch #453BA73 box is wired for 220 VAC (split buss) single phase.

Trace the 110 VAC out through the center hub to the platform connection. If trouble is found between the switch box and the rectifier unit it will be a wiring problem or a bad commutator brush.



If you have 110 VAC electricity up to the rectifier unit and no output voltage 90 VAC from the rectifier, first reset the small 1/2 amp circuit breaker button. If still no output, the rectifier unit must be repaired or replaced.

If you are experienced with electronic repair, individual components are available from the factory. If you are not able to repair the circuits, replacement rectifier units are available.



If the rectifier unit is producing 90 volts D.C. and trouble still exists, the electromagnet coil may be open. The magnet should be first checked for magnetism with a steel object like a car pivot pin cap. The magnetic force should be enough so that you have to slide the cap off the side of the magnet and cannot lift it off.

If the magnet is fed 90 VDC and has a weak magnetic field, the coil is shorted and the magnet should be replaced.

If the magnet is strong, then the problem is a mechanical one in the car brake plate or armature plate.

TILT-A-WHIRL®

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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released August 1984 MEMO #12

Place this Memo in your Manual and **inform your staff immediately** of this Memo.

SUBJECT: INSPECTION OF ELECTRIC CAR BRAKE SYSTEM. #346-61 CAR PIVOT FLANGE, #253-612 PLATFORM PIVOT FLANGE, #365-A BRAKE ARMATURE PLATE AND #365-B STUD BOLTS.

Visually inspect car tongue, brake area for excessive wear, cracked castings, loose fasteners, and missing parts: Using Diagram 1, measure distance between points indicated in diagram at two locations. If your measurements are outside the stated limits your electric car brake is misaligned and requires a closer inspection and repair. Remove pivot pin cap, cotter pin, lock pin, threaded washer and small fiber washer. Examine car pivot flange and pivot pin (platform pivot flange). If there is a loose fit (play) in between these parts a thorough inspection must be done.

Start by inspecting car as instructed previously. Be sure to clean and inspect car pivot flange and check flange bushing (Part #346-B) for wear. If worn, the bushing can be pressed out and a new bushing pressed in. Replace car pivot flange bushing when worn past 1-5/8" inside diameter. Replace platform pivot flange when pin is worn under 1-3/8". Bolt pivot flange to platform at 30 Ft.-Lbs.

Wear in the bushing may allow the car pivot flange to cut into the magnet terminals shorting them out. If the car flange floor plate is bent, it will cause the bushing to wear out prematurely and misalign the armature plate with electromagnet, causing malfunction of the brake system.

Bend floor plate back to original position using one of two methods. The first method would be to turn the car onto its top in a strong doorway or under something heavy like a semi-trailer. (Remember to put a blanket under car to prevent scratching the finish). Next block the car tongue up until it is level. Then place a hydraulic jack on floor plate, extend jack until contact is made with trailer. Then extend jack until floor plate is in correct position.

The second method would be to use a 1-1/2" diameter steel bar about five to six feet long, inserting the bar through the car pivot flange bushing. Then pull bar to straighten out the car flange plate.

After bending, inspect car tongue area for tears in steel, cracked or broken welds, car flange and fasteners.

When inspecting armature plate assembly, replace any disformed, bent, and/or extensively worn parts. If car pivot flange is defective replace it. Install the new flange by first making sure car flange floor plate is straight (parallel) with car. Bolt flange to car at 30 Ft-Lbs. using 6-3/8x1" Hexagon Socket Flat Countersunk Head Cap Screws.

To re-install armature plate, set armature plate in car pivot flange and line up armature stud holes. Insert armature studs. (Be sure to assemble parts as shown in Diagram 2). Tighten armature studs to 75 Lb.-Ft. only. Any excess torque will balloon studs. Make sure armature plate moves freely on studs.

While having car off the ride also check the car wheels. Replace wheel if worn under 7-3/4" outside diameter.

Re-install car. After car is on platform again measure inspecting points as shown in diagram. Measurements should be between limits in Diagram 1.

If you need more information contact: **Toll Free 800-533-0390**
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MEMO #12 PAGE 2 OF 2

TABLE NO. 1
Electric Car Brake Alignment Limits. (See Diagram 1 for locations)

	AT POINTS A.	AT POINTS B.
NEW	2-1/2 to 2-5/8	2-1/2 to 2-3/8
ALLOWABLE OPERATING	2-1/2 to 2-11/16	2-1/2 to 2-5/16
SHUT DOWN (SEE BELOW)	OVER 2-3/4	UNDER 2-5/16

Operating in shut down limits will cause extensive damage to parts and will cause brake to malfunction.

DIAGRAM 1

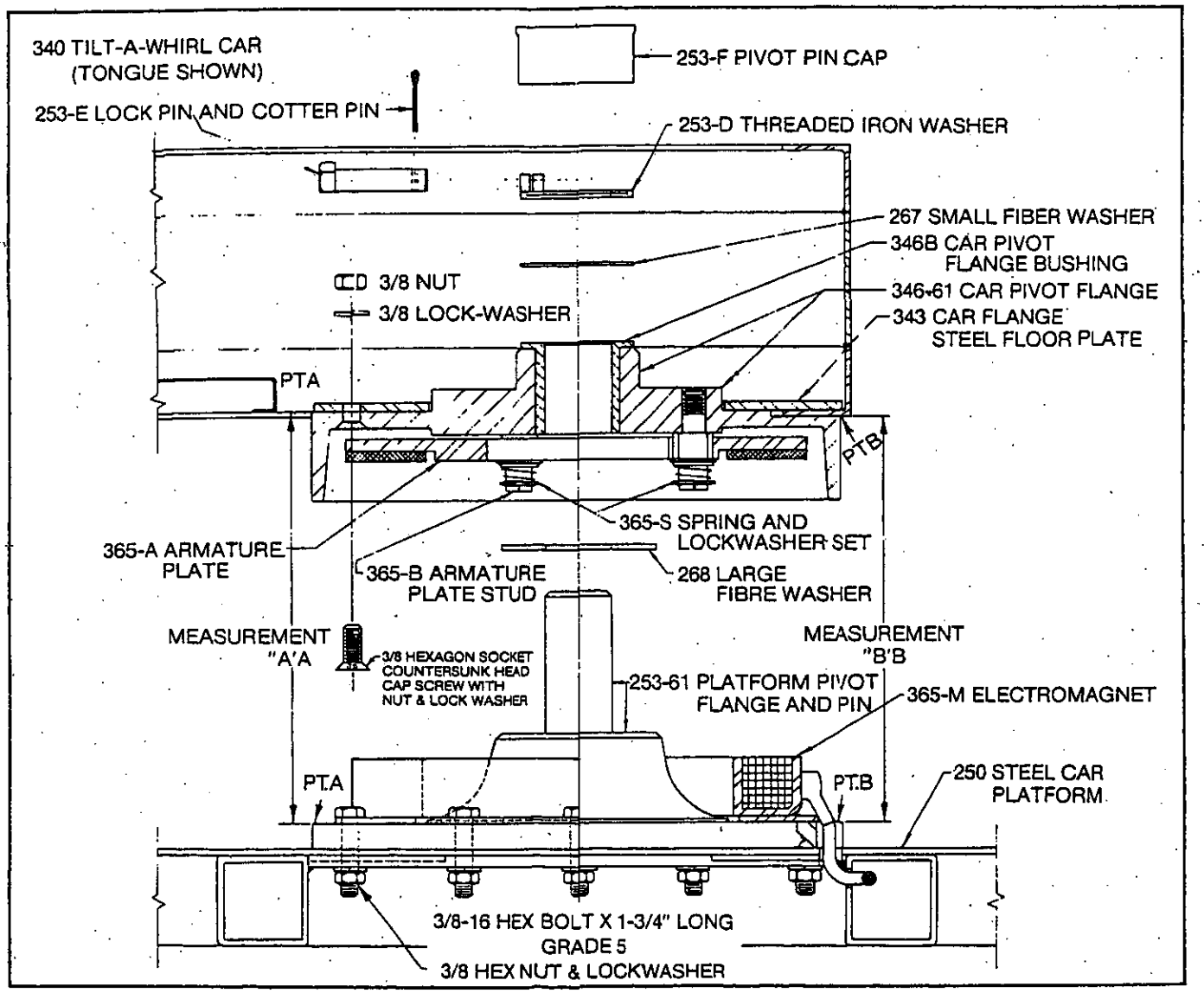
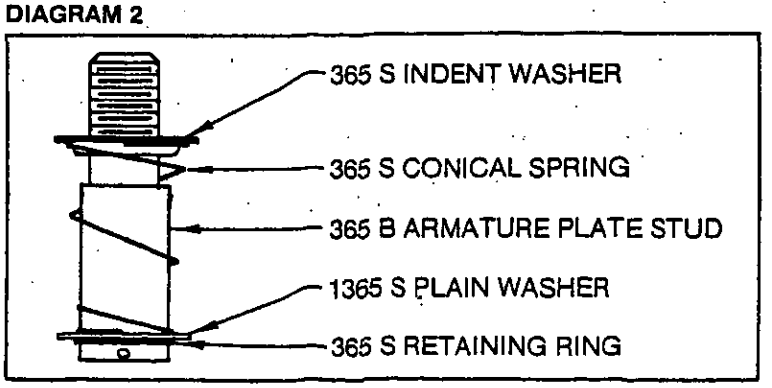


DIAGRAM 2



TILT-A-WHIRL®

Amusement Ride

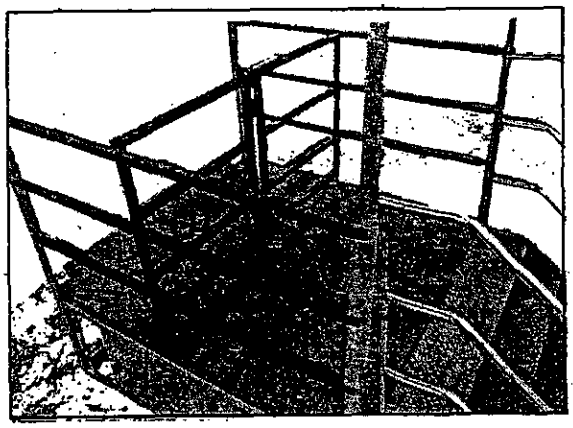
OPERATION AND SERVICE MANUAL

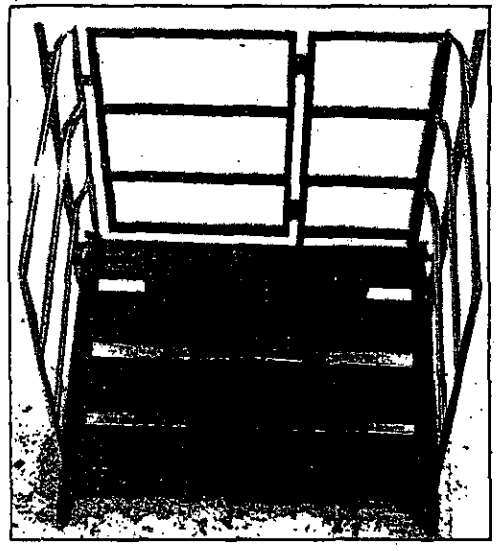
MAINTENANCE MEMO

Released February 1986 MEMO #013 Page 1

Place this Memo in your Manual and **inform your staff immediately** of the Memo.

SUBJECT: #552-86-K NEW ENTRANCE AND EXIT GATE SYSTEM
3 Pieces, Standard Blue Color.





INSTALLATION INSTRUCTIONS:

Entrance Gate

1. Using the 1-3/4" deep pockets (provided in kit) as template, cut 2 square holes on the inside of the outer 2"x1" tubing next to the center cross piece.
2. Weld the 1-3/4" deep pockets in the corner of the tubing frame where the previous cut holes are.
3. Place entrance swing gate in platform pockets and drill a 5/16" hole through the pocket and gate leg. Drill hole the same direction as the outer tubing so as not to interfere with the set-up of the loading platform. Use lock pin provided to lock gate into place.

Exit Gate

1. Measure back 2-3/4" from the edge of the top step that fits against the sidewalk, cut first square hole against the side of the step jack or riser. Weld the 3-1/4" deep pocket under the step thread flush with the top of the thread plate. Measure the distance between the gate legs and cut the square hole again back 2-3/4" from the edge. Weld plate with pocket to the bottom side of step thread. Place exit gate into step pockets and drill 5/16" hole through the side of the step and the pocket. Use lock pin provided.

KIT INCLUDES: 2 Pieces Exit Gate Assembly
1 Entrance Gate Assembly
3 Lock Pins
2 1-3/4" Deep Pockets for Entrance
2 3-1/4" Deep Pockets for Exit
2 3-1/4" Pockets with Plate for Exit

Also available in a 1 piece Split Entrance Gate Unit, consisting of a center railing with 2 gates for entrance and exit.

If you need more information contact:

Toll Free 800-533-0390
SELLNER MFG. CO., INC.
P.O. Box 8, Faribault, MN 55021

TILT-A-WHIRL®

Amusement Ride

OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

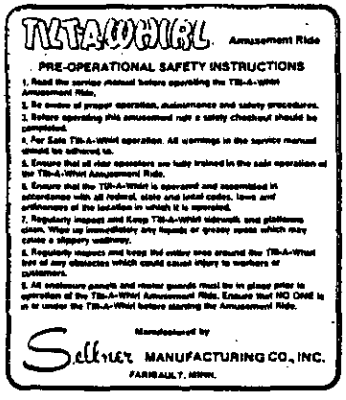
Released January 1986 MEMO #14

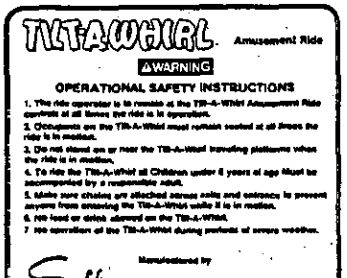
Place this memo in your Manual and **inform your staff immediately** of Memo.

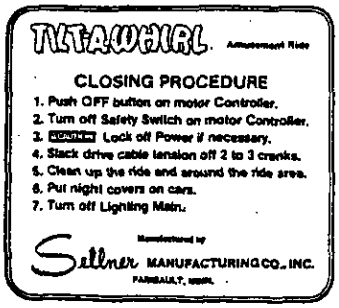
SUBJECT: TILT-A-WHIRL SAFETY INSTRUCTION STICKERS

Enclosed with this memo are four Tilt-A-Whirl Safety Instruction Stickers, like the ones pictured below. These stickers must be permanently placed in an area visable to the Tilt-A-Whirl Operator and Tilt-A-Whirl Maintenance Personnel. If additional stickers are needed or these stickers become defaced or illegible, please request replacements by contacting Sellner Manufacturing Company.

We suggest that a panel be added to the operator's platform for these stickers, inspection stickers and a holder be built for the Tilt-A-Whirl's daily inspection Check-list.







If you need more information contact: **Toll Free 800-533-0390**
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TILT-A-WHIRL®

Amusement Ride

OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released November 1987 - Memo #E7-01 Page 1 of 1

Place this Memo in your manual an inform your staff immediately of this memo.

Subject: Electric 7 Drive Tilt-A-Whirl Sweep Clevis Problems and conversion to Ball Type Center Hub.

Two of our owner/operators have reported to us that the sweep pin (#166-C) has backed out and the sweeps have dropped,bending track spoke frames before the ride can be stopped. This problem is only found on E-7 Drive Tilt-A-Whirls with the Clevis Type Center Hub. The Hinge alignment to the Electric 7 Tilt-A-Whirls has reduced the clearance between the sweeps and the spoke frames so that any failure of the sweep pin will cause a problem of hitting each other.
Also the wear in the pin hole in the sweep end plate will eventually have to be repaired or the sweeps will start hitting the spokes of the Tilt-A-Whirl. Daily inspection is needed to make sure that the sweep pins are in place and that the hair-pin cotters or cotter pins are in good shape. Inspect the plate bolts to make sure they are tight. A drop of oil between the plates over the sweep pin will help.

The two Trailer/Mounted Tilt-A-Whirls and one park model E-7 Tilt-A-Whirl were equipped with a new design ball hitch center hub. This hub uses 2" Trailer balls with "Bulldog" swing jaw type hitches bolted to the end of the sweeps. This new set-up has been trouble free and has eliminated the sweep pin problem. The conversion is available from the factory and requires disassembly of the center hub and sweep ends, drilling of four 1/2" holes on the end of each sweep, installation of the new ball type hub, bolting on the new ball hitches to the sweeps and reassembly of the center hub and the rest of the Tilt-A-Whirl. Order the following:

7 -	#205E7 2" Ball Hitch on Sweep Hopper	125.00	875.00
1 -	#158E7 Center hub with 2" Hitch Balls		805.00
1 -	Drill Template for Conversion	No Charge	
			$1680.00

If you need more information contact:
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P.O. Box 8, Faribault, MN 55021

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Amusement Ride

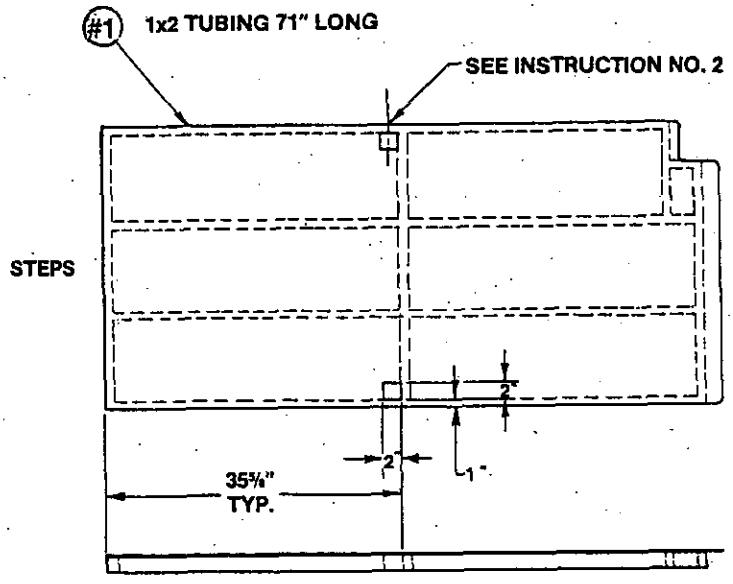
OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released June 1988 MEMO #015 Page 1

Place this Memo in your Manual and **inform your staff immediately** of the Memo.

SUBJECT: ENTRANCE GATE INSTALLATION



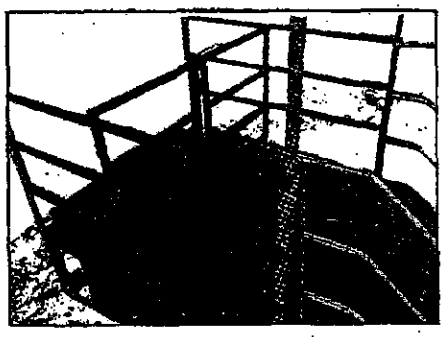
LEFT ENTRANCE PLATFORM
TAW PART NO. 553

WARNING

ENTRANCE GATE IS TO BE INSTALLED ONLY AS SPECIFIED. IF GATE IS INSTALLED ANY CLOSER TO RIDE SERIOUS INJURY MAY RESULT.

ENTRANCE GATE PARTS LIST:

1 Entrance Gate Assembly
1 Lock Pin
2 1¾" Deep Pockets



INSTALLATION INSTRUCTIONS:

ENTRANCE GATE

#1. Using the 1¾" deep pockets (provided in kit) as template, cut 2 square holes on the inside of the outer 2"x1" tubing next to the center cross piece.

#2. Weld the 1¾" deep pockets in the corner of the tubing frame where the previous cut holes are. Pockets must be welded flush with the top of the decking.

NOTE: The pocket with the 5/16" hole has to go on the notched side of platform as indicated on drawing. The hole must be perpendicular to piece #1. You will have to drill a 5/16" hole in piece #1 either before or after you weld the pocket on, to match the hole in the pocket.

If you need more information contact:

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SELLNER MFG. CO., INC.
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Amusement Ride

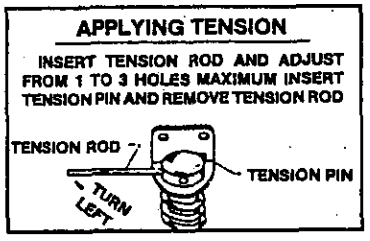
OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released June 1988 MEMO #016 Page 1

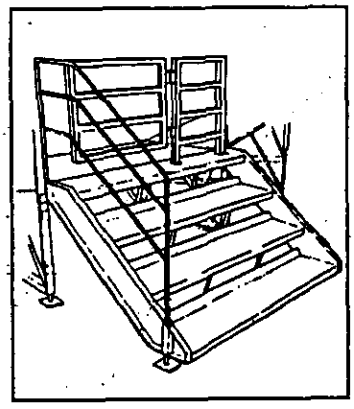
Place this Memo in your Manual and **inform your staff immediately** of the Memo.

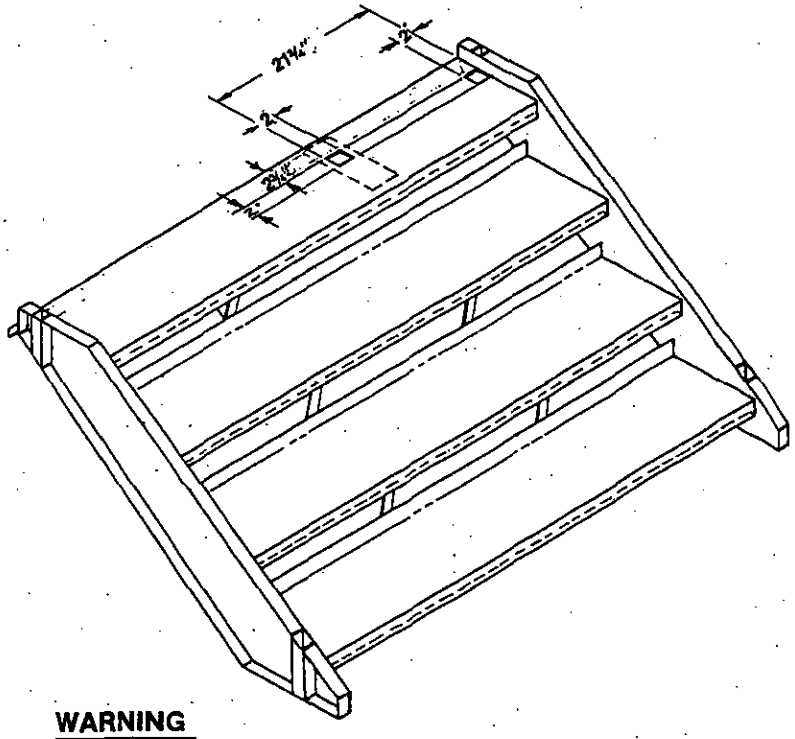
SUBJECT: EXIT GATE INSTALLATION



EXIT GATE PARTS LIST (Per Exit):

- 1 Exit Gate Assembly
- 1 Lock Pin
- 1 3¼" Deep Pocket
- 1 3¼" Deep Pocket With Plate





INSTALLATION INSTRUCTIONS:

EXIT GATE

Measure back 2¾" from the edge of the top step that fits against the sidewalk, cut first square hole against the side of the step jack or riser. Weld the 3¼" deep pocket under the step tread flush with the top of the tread plate. Measure the distance between the gate legs and cut the square hole again back 2¾" from the edge. Weld plate with pocket to the bottom side of step tread. Place exit gate into step pockets and drill 5/16" hole through the side of the step and the pocket. Use lock pin provided. Fill in gap on pocket.

WARNING

EXIT GATES ARE TO BE INSTALLED ONLY AS SPECIFIED, MAKING SURE GATES OPEN OUTWARD (AWAY FROM INSIDE OF RIDE) OTHERWISE SERIOUS INJURY MAY RESULT.

If you need more information contact: **Toll Free 800-533-0390**
Fax 507-334-0503
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OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released October 1988 MEMO #17

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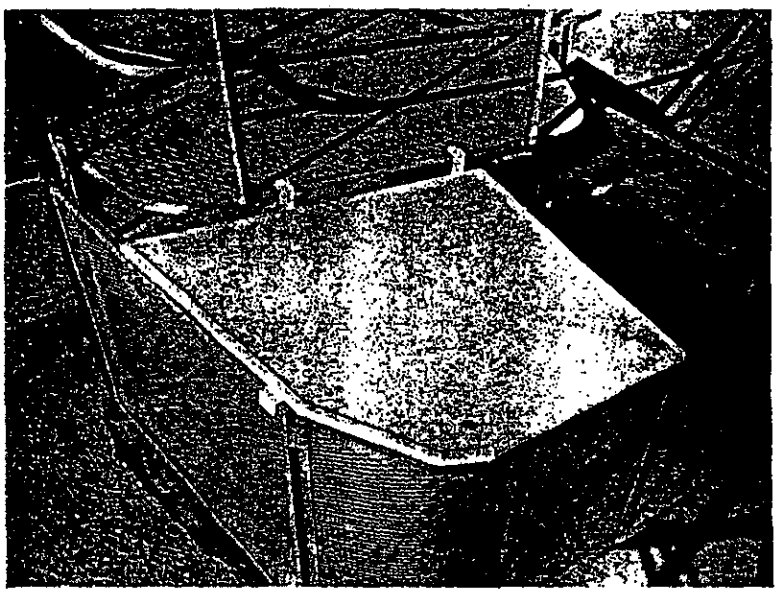

SUBJECT: OUTBOARD ELECTRIC MOTOR ENCLOSURE

TOP PANEL INSTALLATION

With your Cable Drive Tilt-A-Whirl setup, look at the electric motor enclosures.

Position the enclosures so the two side panels are an equal distance from the electric motor cart. Also, **make sure** you have all the panels pinned in place.

Position the outboard electric motor enclosure top panel so the channel clip fits over the side panel and the two clips with pins are resting on the operator platform. (See Picture)

Mark where the pins lie and remove the top panel. Drill two 3/8" holes where you made the marks. Deburr as needed.

Replace the top panel.

You have completed the installation of the outboard electric motor enclosure top panel.

If you need more information contact:

Toll Free 800-533-0390
SELLNER MFG. CO., INC.
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TILT-A-WHIRL®
Amusement Ride

OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released April 1989 MEMO #18

Place this Memo in your Manual and **inform your staff immediately** of this Memo.

SUBJECT: STANDARD SAFETY EQUIPMENT—CABLE DRIVE AND ELECTRIC 7 TILT-A-WHIRL AMUSEMENT RIDE

The following is a listing of safety equipment used on the Tilt-A-Whirl Amusement Ride. This equipment is considered standard equipment by the manufacturer. All the equipment listed should be in operational condition, and is required to be in use on the ride to insure the safety of the riding public. This is not a complete list, as new safety equipment is under development. Many components are not mentioned that are needed for safe operation of the Tilt-A-Whirl.

1. LIGHT SYSTEM:
   a. If the Tilt-A-Whirl is operated at night or in dim light conditions. Adequate light should be provided to allow for safe loading, unloading and observation of the passengers by the ride operator. A minimum light level of 5 Foot Candles will be obtained.
   b. Light System Wiring: Important safety improvements have been made to the Tilt-A-Whirl light system wiring. All cord sets are to have male to female connectors, so that if disconnected no live conductors will be exposed. All fixtures, feed cords and panels must have a separate continuous equipment ground. The commutator for the center lights and electric brake system is enclosed for safety and weather protection and has a separate equipment ground brush and ring.

2. TILT-A-WHIRL CARS:
   a. Car Brake Systems: The Tilt-A-Whirl Car is equipped with two braking systems for the safety of the passenger while loading and unloading. The Electric Brake System is operator controlled and functions through the pivot flange and hub of the car. The Manual Brake System is applied by the seat handle bar. Both systems are designed as holding brakes only. Both systems must be operational.
   b. Car Tops: The Tilt-A-Whirl car should have a car top to prevent people from standing in the car and to keep hands, arms, etc. from protruding out the back of the car and coming in contact with the other Tilt-A-Whirl cars.
   c. The Car Cushions or Fiberglass Seats should protect the rider from the edges of the steel structure of the car.
   d. A Warning Sign is displayed in the car to inform the passenger that they should "REMAIN SEATED WHILE THE RIDE IS IN MOTION."
   e. Pivot Pin Kit: The car must be retained on the pivot pin using a group of components called a Pivot Pin Kit. These components must be properly assembled and free of wear. See Maintenance Memo #003.
   *f. Sealed Wheels: New Tilt-A-Whirl cars come from the factory equipped with permanently lubricated car wheels. These sealed assemblies eliminate the grease zerk and the possibility of over greasing.
   *g. Head Rest Cushions: New E-7 Tilt-A-Whirl cars come equipped with head rest cushions, due to the increased action of the E-7 Tilt-A-Whirl.

*Considered optional at this time by manufactuer.

If you need more information contact: **Toll Free 800-533-0390**
SELLNER MFG. CO., INC.
P.O. Box 8, Faribault, MN 55021

3. PLATFORMS AND SIDEWALKS:
   a. Non-Skid Coating: All platform surfaces are coated with a "Non-Skid" paint to provide increased traction.
   b. Traveling Fence: The Traveling Fence must be in place prior to operation of the Tilt-A-Whirl. The Traveling Fence boards extend to the platform surface to form a toe board and keep the customers foot from slipping off the platform.
   c. Sidewalk Section: The Sidewalk Sections must be secured to the horses or supports with hairpin cotters to prevent the sections from bouncing off the pins. *The new Cable Drive Tilt-A-Whirl sidewalk sections are equipped with a toe board to prevent the customers foot from slipping off the sidewalk surface. These toe boards also narrow the gap between the enclosure panel and the bottom fence rail to under Nine inches.
   d. A center cover must be in place prior to operation of the Tilt-A-Whirl. This Center Cover must be in good condition.
   e. U Bolts: On the Cable drive Tilt-A-Whirl the platform must be secured using U bolts and brackets.
   f. The platform pins on the cable drive platform have two holes in them. These pins must be secured with a hairpin cotter in the top hole so that they cannot work upward and become a trip hazard.

4. ENCLOSURES, FENCING and STEPS:
   a. Enclosure Panels: All Enclosure Panels and Engine enclosures must be in place prior to the operation of a Tilt-A-Whirl. The E-7 Enclosure panels extend four inches above the sidewalk sections to form a toeboard. The panels and railings must be fastened in place so that they cannot be affected by the normal operation of the Tilt-A-Whirl. The panels must form an effective barrier to keep people and animals from beneath the Tilt-A-Whirl.
   b. The Tilt-A-Whirl Fence Railings must be in place and in a condition to withstand 200 lbs. of force. They must be free of sharp edges.
   c. Entrance and Exit Gates: In 1988 a new gate system was developed by the manufacturer to replace the existing gate chains. The gate system is Self closing and is an improved barrier. Entrance and Exit gates must be used. See Maintenance Memos #13, 15 and 16.
   d. Entrance and Exit Steps: In 1960, steel Entrance and Exit Steps were designed and manufactured for the Tilt-A-Whirl. These step units are uniform with most building codes and have hand railings. The top tread is at the same level as the sidewalk section to provide a transition on and off the machine.

5. STRUCTURE AND UNDERCARRIAGE:
   The steelwork and running gear for the Tilt-A-Whirl is extremely durable. With annual maintenance and environmental protection (Paint) the structure should remain in good condition. Wear is found on the pins, bolts and parts that are easily replaceable. All fasteners must conform to the fastener schedule found in the 1989 Partsbook. Placement and function of fasteners will be insured by daily inspection.

6. POWER TRANSMISSION:
   a. Clutch Brake Band: The Cable drive Tilt-A-Whirl power transmission has a brake band to hold the drive sheave from turning and the Tilt-A-Whirl platforms from moving. This brake must be functional prior to the operation of the Tilt-A-Whirl. A kick plate is used on the operators platform to keep this brake set.
   b. Electric Motor Controller: The electric motor driven Tilt-A-Whirl must be equipped with a Motor Controller. The Motor Controller or Combination Starter will have a disconnect switch and a magnetic contactor to supply electricity to the motor. The motor start and stop switch and the disconnect switch must be in easy reach of the ride operator. The motor enclosure should be continuous around the motor. A top panel has been manufactured to cover this area. See Maintenance Memo #17.
   c. Gasoline Engine: A kill switch for the gasoline engine must be in easy reach of the operator. The gasoline engine fuel tank must be a closed container, with fuel supply for daily operation. Re-fueling should not be done on a hot engine. The Engine enclosure must be continuous around the gasoline engine.

*Considered optional at this time by manufacturer.

If you need more information contact: **Toll Free 800-533-0390**
SELLNER MFG. CO., INC.
P.O. Box 8, Faribault, MN 55021

TILT-A-WHIRL®

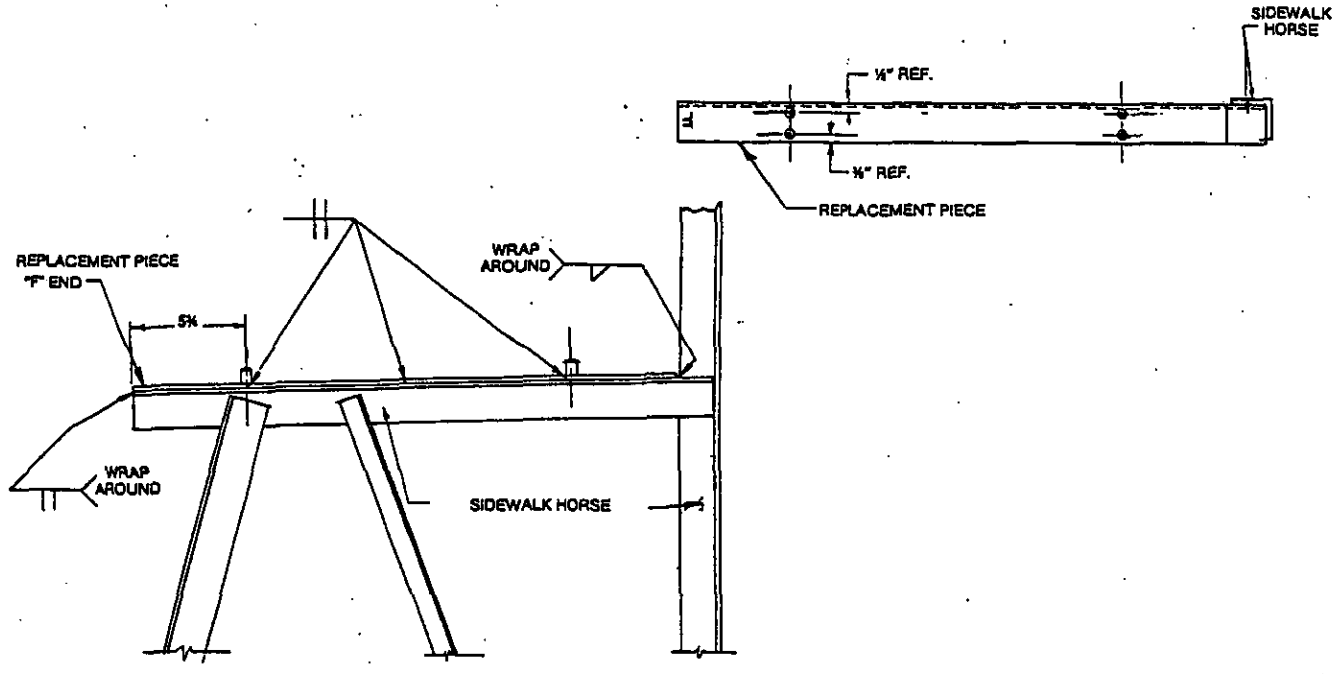
Amusement Ride

OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released May 1989 MEMO #19

Place this Memo in your Manual and **inform your staff immediately** of the Memo.



SUBJECT: SIDEWALK STUD REPLACEMENT KIT.

On modern Tilt-A-Whirls, there is provision to pin the sidewalk section to the sidewalk support stand. Use a #3 Hairpin cotter through each of four sidewalk studs just above and inside the angle iron on the bottom of the sidewalk. Fastening the sidewalk section to the support stand is an important safety consideration and is manditory for both the carnival and park operator.

The sidewalk must remain over the support studs. People bounding around the sidewalk could possibly dislodge the sidewalk section. Also a high wind can lift the sidewalk off a Tilt-A-Whirl. The sidewalk must be pinned to the supports to provide a safe and secure walkway.

For older model Tilt-A-Whirls, we have a Sidewalk Stud Replacement Kit. We pre-space and align the studs on a piece of flat steel. You cut the old studs off the top of your supports and weld this new plate with studs on top of the support. A coat of paint and 96 hairpins and your sidewalk is secure on the sidewalk horses. Order the kit below:

1 Set (24) #A324090 Sidewalk Stud Plates (Weld On) **$273.60**
100 #T701002-03 #3 Hair Pins **$6.50**

If you need more information contact:

Toll Free 800-533-0390
SELLNER MFG. CO., INC.
P.O. Box 8, Faribault, MN 55021

TILT-A-WHIRL®
Amusement Ride
OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

RELEASED APRIL 1989 MEMO #20 COVER PAGE

Place this Memo in your Manual and **inform your staff immediately** of this Memo.

SUBJECT: TILT-A-WHIRL INSPECTION REPORT, CABLE DRIVE

The attached report sheets (Pages 1-4) represent a comprehensive inspection for the Cable Drive Tilt-A-Whirl. This level of inspection should be performed periodically according to the use of the amusement ride. This would be a good annual inspection and should be monthly in a permanent installation with heavy daily operation. This inspection should be performed on a portable Tilt-A-Whirl prior to long heavy use, such as a state fair. A daily check of the Tilt-A-Whirl is outlined in the Tilt-A-Whirl Service Manual and on Maintenance Memo #004. These materials are intended as guidelines and may be improved upon as need arises.

The inspection report starts out with room for information about the Tilt-A-Whirl and continues as a list of components with lines for notes as to condition and comments. A simple check mark or "OK" is all that is needed if the component is in good condition and is in place, secure, and functional. If a problem is found the comments will be special to the component. Such as: Poor Blocking — Reblock, Worn to 9/16" — OK, Broken — REPLACE. Problems requiring attention should be listed in the Recap Section of the report and repaired or replaced as needed.

This inspection can be performed by people with mechanical and electrical knowledge and ability. The inspection is visual and requires measurement. Additional Non-distructive testing of the Tilt-A-Whirl may be used, but is not required by the manufacturer.

For additional information, service manual and maintenance memo pages, repair parts and instructions, please contact:

SELLNER MANUFACTURING COMPANY
P.O. Box 8, 515 Fowler Street
Faribault, Minnesota U.S.A. 55021-0008
(800) 533-0390 WATS (507) 334-5584 Local

TILT-A-WHIRL INSPECTION REPORT April 1989 SELLNER MFG. CO. PAGE 1

Name of Owner _____

Location _____

Contact _____

Inspection Date _____

Tilt-A-Whirl Serial Number _____

Inspector _____

Area of Inspection	Condition Found and Comments
CENTER HUB — Ref: Maint. Memo #008	
Blocking	
Wood Base	
Spoke Flange Studs (½" Min.)	
Spoke Lock Down Plate	
Canvas Stand	
Electrical Box	
Sweep Clevis (⅜" End Play Max)	
Sweep Pins (11/16" Minimum)	
Hub Bearing	
Commutator: Make _____	
Lock Down Collar	
Brushes	
Brush Holders	
Wiring	
Receptacles	
Cover	
Center Light Stand	
Center Light Feed Cord	
Center Canvas	
Center Canvas Springs	
TRACK — Ref: Maint. Memo #009	
Wheel Tracking	
Joints	
Pin Size (½" New)	
Blocking	
Quarter Blocked ?	

Area of Inspection	Condition Found and Comments
SPOKES	
Straightness	
Stud Holes at Center Hub	
Spoke End Pins and Hairpins	
Spoke Braces	
TROLLEYS	
Sweep Bracket	
Pins and Holes	
Trolley Axle Bracket	
TROLLEY WHEELS	
Steel Wheels — 9¾" Min.	
PolyUrethane Capped	
Trolley Wheel Axle	
¼"x2" Cotter Pins in Axle	
SWEEP CHANNELS — Ref: Maint. Memo #009	
Straightness	
Clevis Pin Hole (⅞" Max)	
Platform Pin Hole — Cracks?	
Cable Forks	
Cable Fork Packings	
Cable Fork Bolts	
CAR PLATFORMS — Ref: Maint. Memo #009	
Pivot Flange (1-7/16" Min.)	
Pivot Flange Fastener — ⅜"x1¾" Grade 5	
Pivot Flange Frame	
Deckplate	
Tubing Wear by Sweeps	
Car Track	
Non-Skid	
Platform Hinge	
Platform Hinge Bolts (⅝" Min.)	
Hinge Fasteners	
U Bolt Bracket	
U Bolt	
Traveling Fence Bracket	
TRAVELING FENCE	
Toe Board	

TILT-A-WHIRL INSPECTION REPORT April 1989 SELLNER MFG. CO.

Area of Inspection	Condition Found and Comments
INTERMEDIATE PLATFORMS	
Deckplate	
Non-Skid	
Hinge Hook	
Hook Fasteners	
POWER TRANSMISSION — Ref: Maint. Memo #2, 5, 6, and 10	
Clutch Brace	
Clutch Brace Holes	
Clutch Brace Pins	
Clutch Frame Brackets	
Base Frame to Clutch Pin	
Drive Belts	
Drive Belt Tension, Alignment	
Clutch Blocks	
Sliding Sleeve	
U Joint and Bolts	
Clutch Brake	
Drive Sheave and Packing	
Idler Sheave	
Tightner Base and Springs	
Turn Buckles	
Clutch Blocking	
#1 Sidewalk Horse to Drive Sheave Clearance	
Drive Cable	
Shifting Levers	
ELECTRIC MOTOR	
Motor Base or Truck	
Brace and Turnbuckle	
Wiring	
Push Button Station	
Safety Switch — Fuses	
Enclosure	
GASOLINE ENGINE	
Start/Stop Switch	
Throttle/Governor	
Fuel Storage	
Fire Extinguisher	

Area of Inspection	Condition Found and Comments
Engine Truck	
Brace and Turnbuckle	
Enclosure	
OPERATORS PLATFORM	
Decking	
Secured Properly	
Supporting Pins	
Kick Plate	
SIDEWALK SUPPORTS	
Pinned Track	
Sidewalk Pinned	
TILT-A-WHIRL CARS — Ref: Maint. Memo #001	
Car Frame and Sheet Metal	
Floorboards	
Car Pivot Flange	
Flange Fasteners	
Pivot Flange Bushing (1⅜" Max)	
Pivot Pin Kit	
Fiber Washers	
Lock Pins	
5/32"x1" Cotters	
Dust Cap	
Threaded Washer	
Brake Shoe Lining	
Car Wheels (7¾" Min.)	
Car Wheel Axle and Cotter Pin	
Car Wheel Bracket	
Seat Handle Bar Holders	
Seat Handle Bar	
Height Handle Bar to Seat	
Car Top Corner Loops	
Car Top Hold Down Hook	
Free of Sharp Edges	
Non-Skid on Floor	
General Condition	
CAR TOPS	
Type of Top	
Corner Hooks	
General Condition	

TILT-A-WHIRL INSPECTION REPORT April 1989 SELLNER MFG. CO.

Area of Inspection	Condition Found and Comments
FENCE RAILS	
Fence Rail Studs	
2 or 3 Rail System ?	
SIDEWALK SECTIONS	
Toe Board	
Pinned to Sidewalk Supports	
Non-Skid	
ENTRANCE AND EXITS	
Entrance	
Railings	
Loading Platform	
Assembled Properly	
Non-Skid	
Entrance Canvas	
Entrance Gate	
Proper Clearance	
Steps	
Secured	
Non-Skid	
Hand Rails	
ENCLOSURE PANELS	
Assembled Properly	
Type of Enclosure	
Engine Guard	
LIGHT SYSTEM	
Type	
Light Support Angles	
Light Sections	
Tilt-A-Whirl Signs	
Light Cords	
Connectors — Receptacles	
Switch Box	
Circuit Breakers	
Rain-Tight	
Dead Front	
Main Breaker	
Not Bonded	
Properly Grounded	

Area of Inspection	Condition Found and Comments
Secure Mounting	
Elec. Brake Control	
ELECTRIC BRAKE SYSTEM — Ref: Maint. Memos #11 and 12	
Brake Operation	
Holding Power	
OPERATION OF RIDE	

WARNING: Use caution when watching moving parts within the machine. Turn off and lock out before making adjustments or working under the Tilt-A-Whirl. Do not work alone. Stand clear of moving platforms.

Counter Clockwise	
Max 6½ RPM	
Trolley Wheel Tracking	
Drive Cable Run-Out	
Clutch Operation	
Clutch Brake Holding Ride	
Safety Stickers and Specifications	
Operating Procedure	
General Condition of Ride	
Area Around Tilt-A-Whirl	

RECAP OF PROBLEMS FOUND: 1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

TILT-A-WHIRL®

Amusement Ride

OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

Released January 1990 MEMO #21

Place this memo in your Manual and **inform your staff immediately** of Memo.

SUBJECT: TILT-A-WHIRL NOMENCLATURE PLAQUE

Enclosed with this memo is an information sign to be used at the entrance of the Tilt-A-Whirl. This sign includes information about the Tilt-A-Whirl and the necessary precautions that should be given the riding public.

The sign should be placed on a panel or sign board in view of the people entering the Tilt-A-Whirl. Should the sign become defaced or illegible please contact Sellner Manufacturing Company for a replacement.

Should this sign be deemed inappropriate for your particular themed area or use, please incorporate the cautions into an acceptable sign or program of information given to the riding public.

The TILT-A-WHIRL, America's Favorite Family Amusement Ride.

The TILT-A-WHIRL was invented in 1926 by Herbert W. Sellner of Faribault, Minnesota, U.S.A. The popularity of amusement rides in the 1920's caused Sellner to build a new amusement ride for use at Wildwood Amusement Park in White Bear Lake, Minnesota. The Tilt-A-Whirl® that he built was so successful that a factory was built in 1927 to produce the machines.

Today TILT-A-WHIRL Amusement Rides can be found in amusement parks and on carnivals throughout the world. The factory, Sellner Manufacturing Company, still makes new Tilt-A-Whirls®, along with repair parts for the operating machines. Each year the Tilt-A-Whirl® is enjoyed by over 70 million riders. Please take a ride and experience the traditional thrills of the Tilt-A-Whirl® Amusement Ride.

TILT-A-WHIRL is a registered trademark of Sellner Manufacturing Company.

CAUTION: People in doctors care, in pregnancy, unable to grasp or hold themselves up, or under the influence of drugs or alcohol should not experience this ride. Children under 46" in height or under 6 years old must be accompanied by a responsible person. No food, drink, or smoking allowed on the ride. Platform surfaces are uneven and may be slippery when wet. Adequate footwear must be worn. Please take care when loading and unloading. Stay seated while the ride is in motion. No more than four adults or five children per car.

Thank you.

Sellner

MANUFACTURING COMPANY, Inc.

P.O. Box 8, 515 Fowler Street
Faribault, Minnesota U.S.A. 55021
(507) 334-5584 (800) 533-0390

If you need more information contact:

Toll Free 800-533-0390
SELLNER MFG. CO., INC.
P.O. Box 8, Faribault, MN 55021

TILT-A-WHIRL®
Amusement Ride

MAINTENANCE MEMO

Released April 1990 E-7 Memo #002

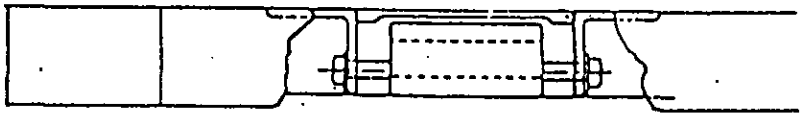
Place this memo in your manual and inform your staff immediately of the Memo.

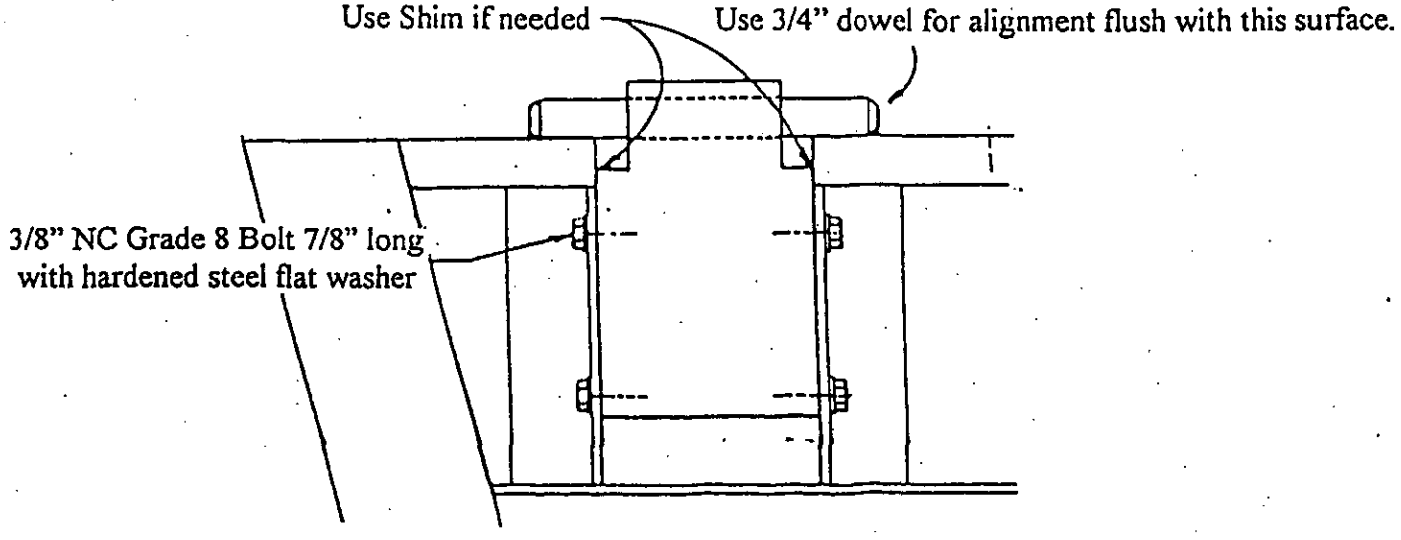
Subject: E-7 Tilt-A-Whirl Hinge Maintenance.

The Electric 7 Tilt-A-Whirl was designed for many years of trouble-free use. We have been well satisfied with the many improvements made to the machine. We have had some problems with the platform hinges. This memo should help you maintain the hinges and prevent problems with them.

The : E-7 platform hinge is aligned at the factory and must be maintained in alignment to prevent premature wear of the hinge. The platform should be numbered and set up in order to keep the hinges in alignment. If your platforms are not numbered (1-7) in counterclockwise order, you should number the platforms to insure that they are always assembled and disassembled in order.

CAR PLATFORM HINGE B225400





TILT-A-WHIRL®

MAINTENANCE MEMO

RELEASED SEPTEMBER 1994 **Memo #22** **Page 1**

This Maintenance Memo is a revision of the previous Memo #18.

Place this memo in your Service Manual and **inform your staff immediately** of this memo.

SUBJECT: STANDARD SAFETY EQUIPMENT-CABLE DRIVE AND E7 TILT-A-WHIRL® FAMILY AMUSEMENT RIDES.

The following is a list of safety equipment used on the Tilt-A-Whirl® Family Amusement Ride. **This equipment is considered standard equipment by the manufacturer. All the equipment listed should be in operational condition, and is required to be in use on the ride to insure the safety of the riding public.** This is not a complete list, as new safety equipment is continuously under development. Many components are not mentioned that are needed for safe operation of the Tilt-A-Whirl®.

1. LIGHT SYSTEM:
   a. If the Tilt-A-Whirl® is operated at night or in dim light conditions, adequate light should be provided to allow for safe loading, unloading and observation of the passengers by the ride's operator. A minimum light level of 5 foot candles should be obtained.
   b. Light System Wiring: Important safety improvements have been made to the Tilt-A-Whirl® light system wiring. All cord sets are to have male to female connectors, so that if disconnected no live conductors will be exposed. All fixtures, feed cords and panels must have a separate continuous equipment ground. The commutator for the center lights and electric brake system is enclosed for safety and weather protection. They also have a separate equipment ground brush and ring.
2. TILT-A-WHIRL® CARS:
   a. Car Brake System: The Tilt-A-Whirl® Car is equipped with two braking systems for the safety of the passenger while loading and unloading. The **Electric Brake System** is operator controlled and functions through the pivot flange and hub of the car. The **Manual Brake System** is applied by the seat handle bar. Both systems are designed as holding brake only. **Both systems must be operational.**
   b. Car Tops: The Tilt-A-Whirl® Car should have a car top to prevent passengers from standing in the car and to keep their hands, arms, etc. from protruding out the back of the car and coming in contact with the other Tilt-A-Whirl® cars.
   c. The fiberglass seat inserts (or cushions in earlier models) should protect the rider from the edges of the steel structure of the car.
   d. A warning sign is displayed in the car to inform the passenger that they should "REMAIN SEATED WHILE RIDE IS IN MOTION."
   e. Pivot Pin Kit: The car must be retained on the pivot pin using a group of components called a Pivot Pin Kit. The components must be properly assembled and free of wear. See Maintenance Memo #003.
   → f. *Head Rest Cushions:* ***All Tilt-A-Whirl® Cars should be equipped with head rest cushions to help protect the passengers.***

3. PLATFORMS AND SIDEWALKS:
   a. Non-Skid Coating: All platform surfaces are coated with a "non-skid" paint to provide increased traction.
   b. Traveling Fence: The traveling fence must be in place prior to operation of the Tilt-A-Whirl® The traveling fence boards extend to the platform surface to form a toe board which should keep a customers foot from slipping off of the platform.
   c. Sidewalk Section: The sidewalk sections must be secured to the horses or supports with hair-pin cotters to prevent the sections from bouncing off the pins. Later model Tilt-A-Whirls® are equipped with a toe board to prevent the customer's foot from slipping off the sidewalk surface. These toe boards also narrow the gap between the enclosure panel and the bottom fence rail to under nine inches.
   d. A center cover must be in place prior to operation of the Tilt-A-Whirl®. The center cover must be in good condition.
   e. U-Bolts: On the cable drive Tilt-A-Whirl® the platform must be secured using U-bolts and brackets.
   f. The platform pins on the cable drive platform have two holes in them. These pins must be secured with a hairpin cotter in the top hole so that they cannot work upward and become a trip hazard.
4. ENCLOSURES, FENCING, and STEPS:
   a. Enclosure Panels: All enclosure panels and engine enclosures must be in place prior to the operation of the Tilt-A-Whirl®. The E7 enclosure panels extend four inches above the sidewalk sections to form a toe board. The panels and railings must be fastened in place so that they can not be affected by the normal operation of the Tilt-A-Whirl®. The panels must form an effective barrier, keeping people and animals from beneath the Tilt-A-Whirl®.
   b. The Tilt-A-Whirl fence railings must be in place and in a condition to withstand 200 lbs. of force. They must also be free of sharp edges. *Tilt-A-Whirls® 1993 or newer are equipped with the newly developed aluminum fence railing which complies with ASTM standards.
   c. Entrance and Exit Gates: In 1988 a new gate system was developed by Sellner to replace the existing gate chains. The gate system is self-closing and is an improved barrier. **Entrance and Exit gates must be used.** See Maintenance Memos #13, 15 and 16.
   d. Entrance and Exit Steps: In 1960, steel Entrance and Exit steps were designed and manufactured for the Tilt-A-Whirl®. These step units are uniform with most building codes and have hand railings. The top tread is at the same level as the sidewalk section to provide a transition on and off the machine.
5. STRUCTURE and UNDERCARRIAGE:
   a. The steel work and running gear for the Tilt-A-Whirl® is extremely durable. With annual maintenance and environmental protection (paint) the structure should remain in good condition. Wear is found on the pins, bolts and other parts that are easily replaceable. All fasteners must conform to the fastener schedule found in the Tilt-A-Whirl® Service Manual. Placement and function of fasteners will be insured by daily inspection.
6. POWER TRANSMISSION:
   a. Clutch Brake Band: The cable drive Tilt-A-Whirl® power transmission has a brake band to hold the drive sheave from turning and the platforms from moving. This brake must be functional prior to the operation of the Tilt-A-Whirl®. A kick plate is used on the operators platform to keep the brake set.
   b. Electric Motor Controller: The electric motor driven Tilt-A-Whirl® must be equipped with a Motor Controller to supply electricity to the motor. The motor start and stop switch and the disconnect switch must be in easy reach of the operator. The motor enclosure should be continuous around the motor. A top panel has been manufactured to cover this area. See Maintenance Memo #17.
   c. Gasoline Engine: A kill switch for the gasoline engine must be in easy reach of the operator. The gasoline engine fuel tank must be a closed container, with fuel supply for daily operation. Re-fueling should not be done on a hot engine. The engine enclosure must be continuous around the gasoline engine.

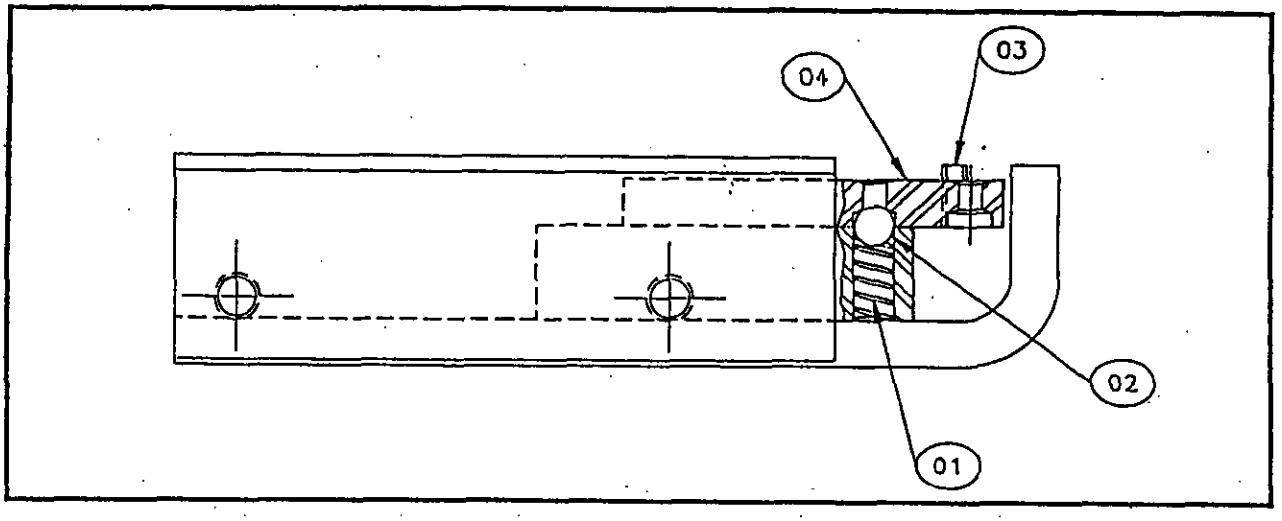
*Considered optional at this time by manufacturer.

TILT-A-WHIRL®

MAINTENANCE MEMO

RELEASED OCTOBER 1994 E7 Memo #03 Page 1

Place this memo in your Service Manual and **inform your staff immediately** of this memo.
SUBJECT: Electric 7 Tilt-A-Whirl: Stainless steel balls, springs and roll pin to replace 5/16" nylon balls, steel spring and roll pin in hinge hardware This memo applies to all E7 Tilt-A-Whirls with serial numbers falling between 2000-E7 and 2043-E7.



Enclosed you should find a replacement kit, containing 28 stainless steel balls, 28 stainless steel springs and 28 roll pins; for your use in replacing your current 5/16" nylon balls, steel springs and roll pins in your Tilt-A-Whirl's hinge hardware.

To install this kit please follow these instructions and refer to the drawing above.
1. Remove the 3/16" x 1/2" roll pin. (Illustration #3 above)
2. Carefully depress the 5/16" nylon ball and slide lock plate so that you will have access to the steel spring and nylon ball. (Illustration #4 above)
3. Remove old spring and ball and install new stainless steel 5/16" ball and stainless steel spring.
4. Slide lock plate back over and install new 3/16" x 1/2" roll pin.

MAINTENANCE NOTE - When setting up or during a weekly inspection, check to insure that there is spring tension on sliding lock plate and ball. To do this simply depress stainless steel ball, it should move freely.

Sellner
MANUFACTURING COMPANY, Inc.
P.O. BOX 8 ★ 515 FOWLER STREET ★ FARIBAULT, MN 55021

☑ **SELLNER MANUFACTURING COMPANY June 10, 1996 TILT-A-WHIRL Maintenance Memo #23 Clarification** - The letter states the position of Sellner in regards to currently available technology and the potential for injury. The company stands behind their statement in Maintenance Memo #23 "All the equipment listed shall be in operational condition and, is required to be used on the ride to insure the safety of the riding public." Some jurisdictional agencies have deemed the equipment mandatory in order to allow operation of the ride. Sellner has made the electric braking system available at a deeply discounted price. For a complete copy of the letter contact Sellner at 800-533-0390

TILT-A-WHIRL®

Amusement Ride

OPERATION AND SERVICE MANUAL

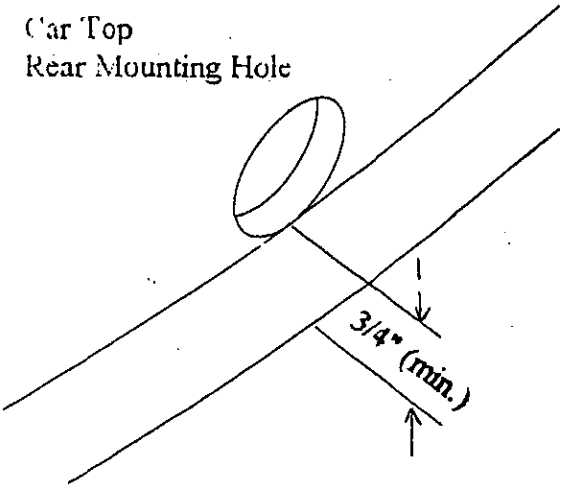
MAINTENANCE MEMO

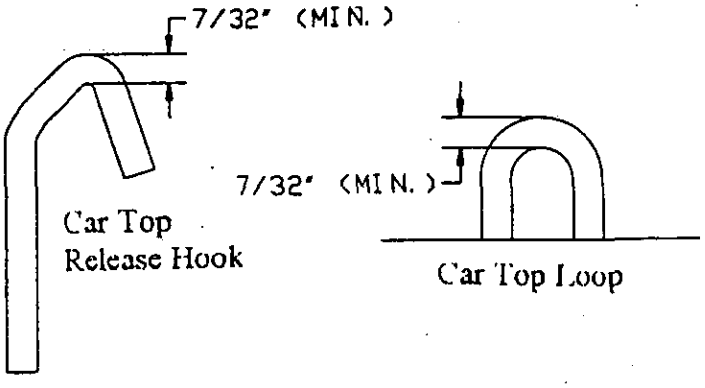
MAINTENANCE MEMO #24 RELEASED JANUARY 1996

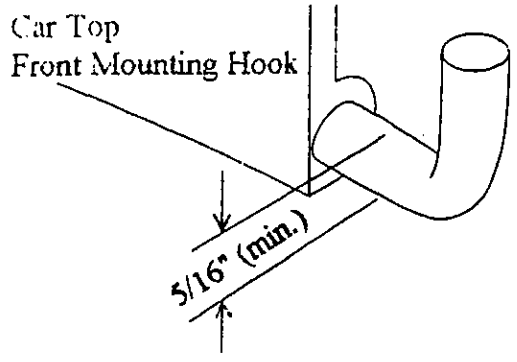
SUBJECT: Tilt-A-Whirl Car Top/Car Top Hook replacement guideline.

Due to the longevity of usage on the Tilt-A-Whirl Amusement Ride, a guideline for replacement of car top components is needed to assure the safe operation of the ride. This guideline affects the following parts:

the car top mounting points (mounting hole at the rear & front mounting hooks)
the car top release hook (located at the rear of the car behind the hood)
the car top loops (each of the two loops located on the car at the front of the hood)







The minimum cross section should be taken at point of wear.

Description of Part	New	Worn	Action Taken
Rear Mounting Hole	1"+	3/4"	Replace Car Top
Front Mounting hooks	7/16"	5/16"	Replace Car Top
Release Hook	5/16"	7/32"	Replace Release Hook
Mounting Loop	5/16"	7/32"	Remove and Reattach new Mounting Loop (1/4 fillet weld)

If you need more information contact:
Toll Free 800-533-0390
SELLNER MFG. CO.
P.O. Box 8, Faribault, MN 55021

TILT-A-WHIRL®

Amusement Ride

OPERATION AND SERVICE MANUAL

MAINTENANCE MEMO

MAINTENANCE MEMO #24 (REVISED) RELEASED MAY 1996
This memo supersedes the Maintenance Memo #24 released January 1996

SUBJECT: Tilt-A-Whirl Car Top/Car Top Hook replacement guideline.

Due to the longevity of usage on the Tilt-A-Whirl Amusement Ride, a guideline for replacement of car top components is needed to assure the safe operation of the ride. This guideline affects the following parts:

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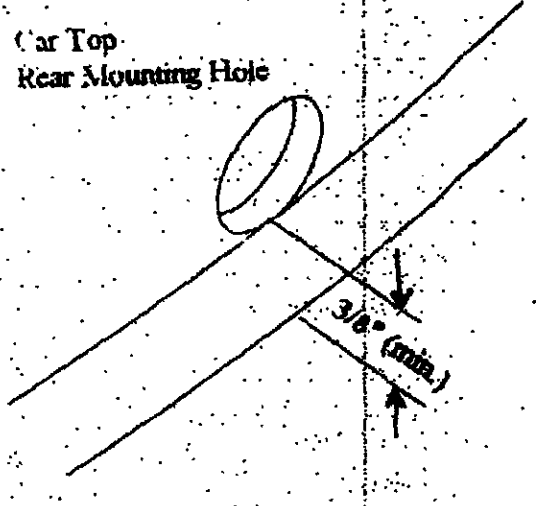

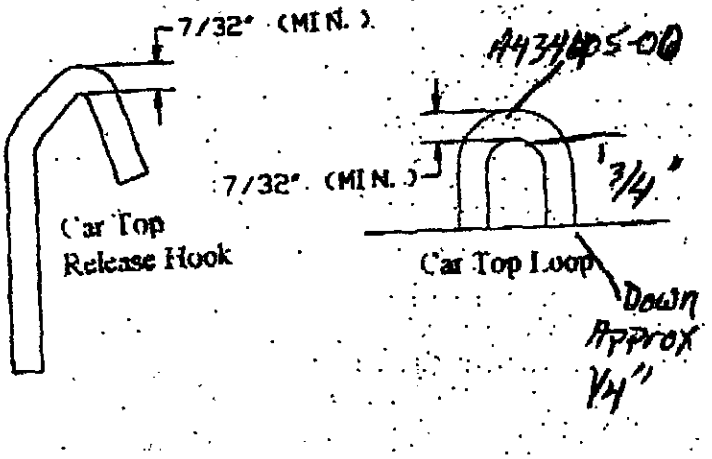

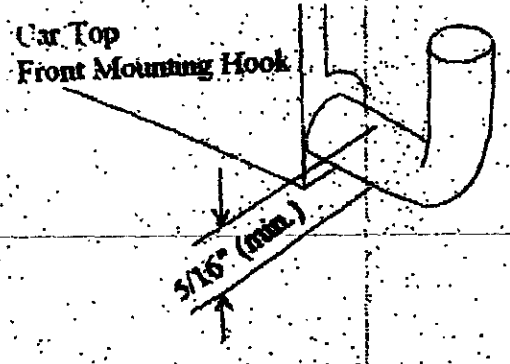

The minimum cross section should be taken at point of wear.

Description of Part	New	Worn	Action Taken
Rear Mounting Hole	1"+	3/8"	Replace Car Top
Front Mounting hooks	7/16"	5/16"	Replace Car Top
Release Hook (P/N A434501)	5/16"	7/32"	Replace Release Hook
Mounting Loop (P/N A434405)	5/16"	7/32"	Remove and Reattach new Mounting Loop (1/4 fillet weld)

For more information contact:

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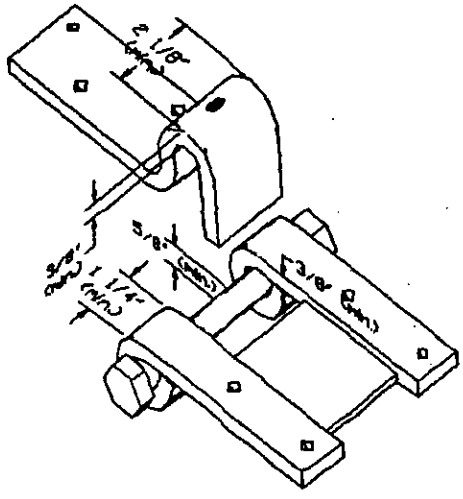
TILT-A-WHIRL®

MAINTENANCE MEMO

MAINTENANCE MEMO #25 RELEASED JANUARY 1996

SUBJECT: **Cable Drive Tilt-A-Whirl platform hinge replacement guideline**
PARTS: **Intermediate Platform Hinge Hook (#A228200); the Outside (#A225400), Inside Left (#A225401) and Inside Right (#A225402) Car Platform Hinges; and the Hinge Bolt (#A225500)**

After years of service, the Cable Drive Tilt-A-Whirl platform hinges begins to show some signs of wear. To assure the integrity of the ride, careful attention should be drawn to the amount of wear exhibited by the these components.
In the diagram to the right, the minimum dimensions are shown. For practical use, the minimum cross section dimensions are measured at the points of maximum wear. New hinge bolts are of Grade 2 material, higher grades are allowed, however, special attention should be given to mating surface wear.



Int. Hinge hook	New	Worn	Action Taken
Width	2 1/2"	2 1/8"	Replace Part
Wall Thickness	1/2"	3/8"	Replace Part

Car. Hinge Eye	New	Worn	Action Taken
Width (Either side)	1 1/2"	1 1/4"	Replace Part
Wall Thickness	1/2"	3/8"	Replace Part

Hinge Bolt	New	Worn	Action Taken
Diameter of shank	3/4"	5/8"	Replace Part

** If the hinge bolt is bent or damaged through the set up of the ride, it is recommended that the hinge bolt be replaced.

Sellner
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P.O. BOX 8 * 515 FOWLER STREET * FARIBAULT, MN 55021

TILT-A-WHIRL®

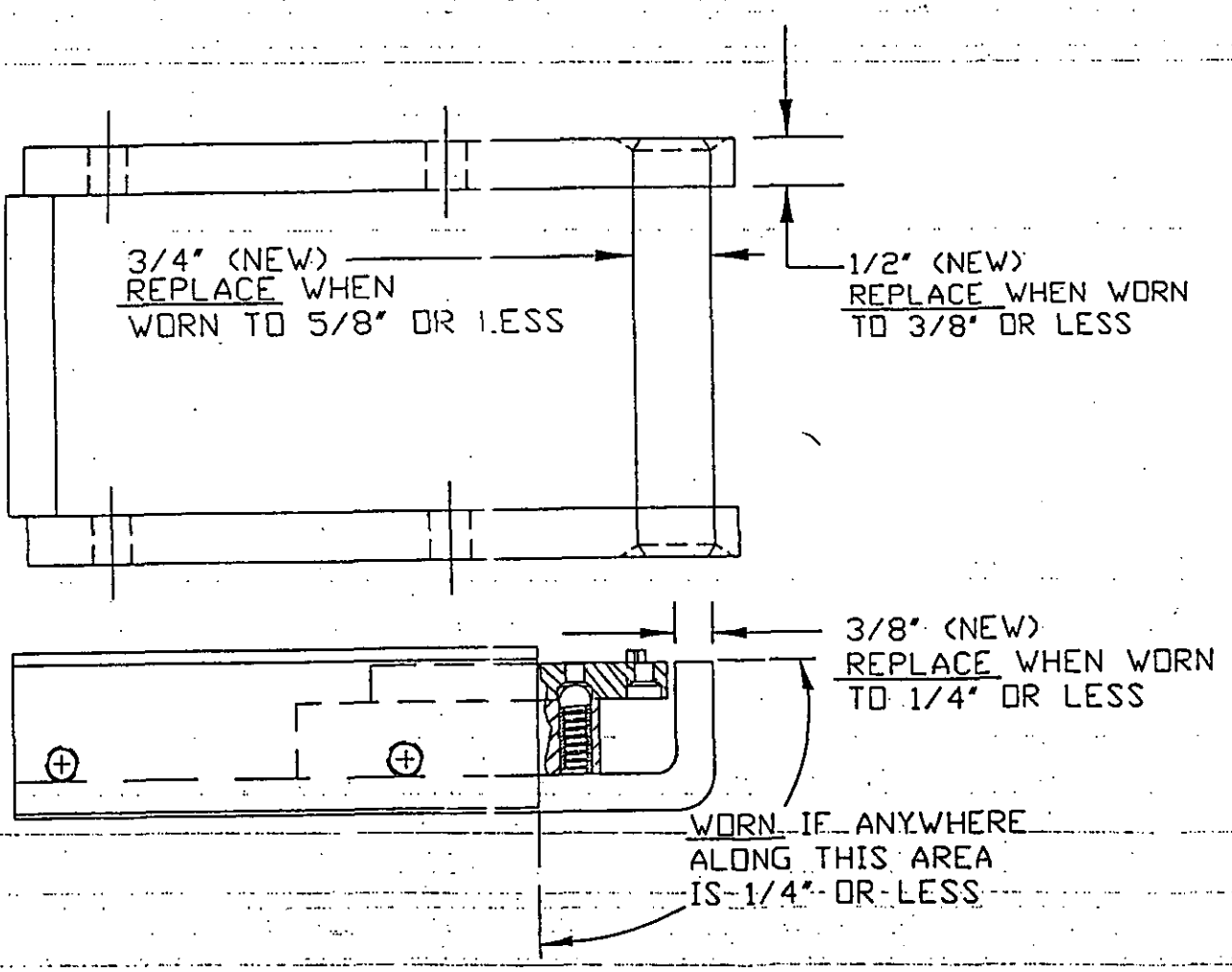
Amusement Ride

MAINTENANCE MEMO

MAINTENANCE MEMO #04 RELEASED JANUARY 1998

SUBJECT: E7 Hardware Replacement Guidelines PAGE 1 OF 1

See memo E7-03 if the stainless steel ball or the sliding lock needs replacing.



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