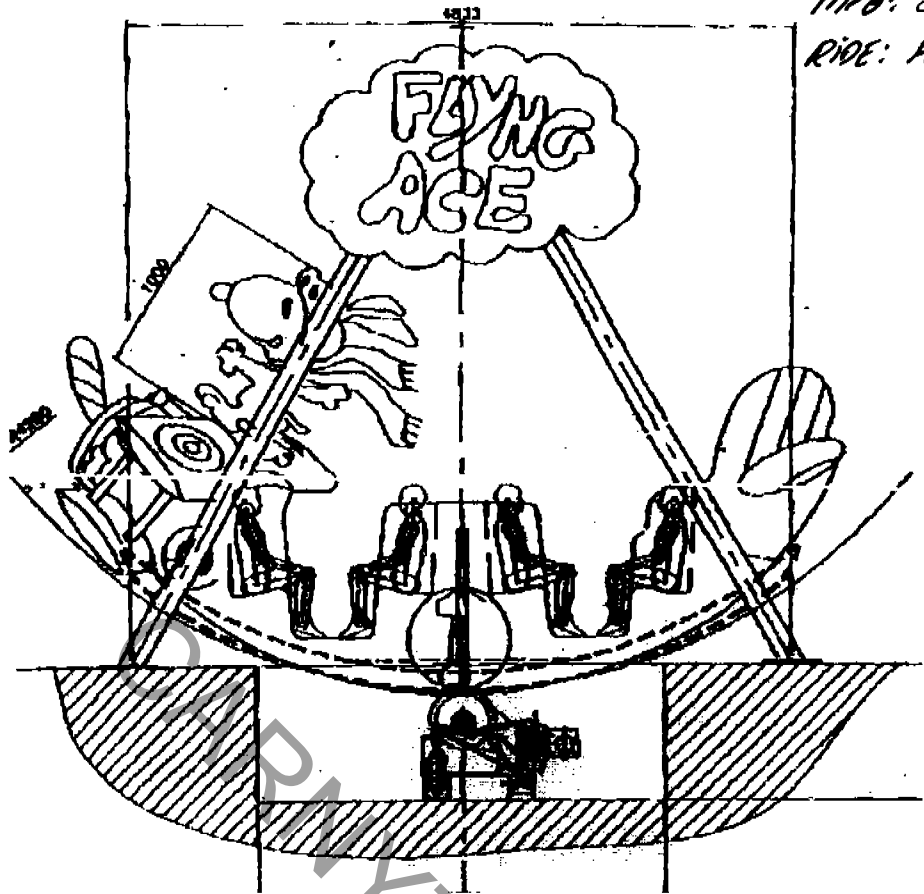


MYB: SARIANI MOSER
RIDE: FREE WHALE/
FLYING ACE



FREE WHALE/ FLYING ACE

MAINTENANCE MANUAL

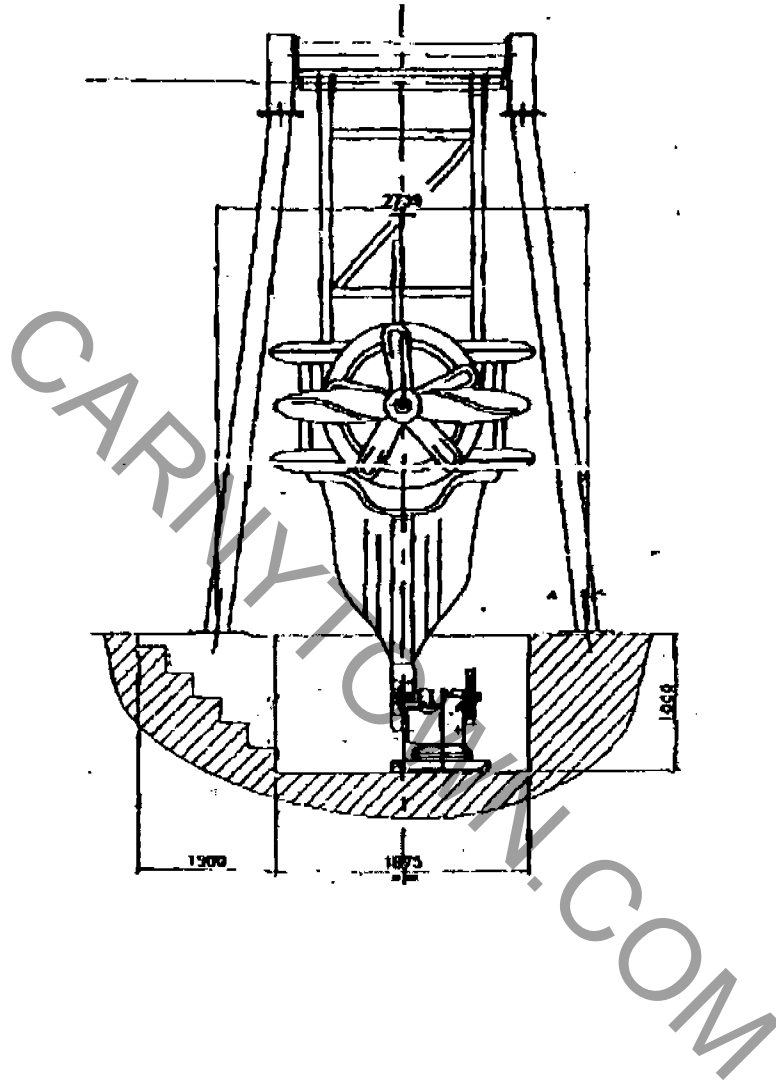
PARK MODEL

Designed and Manufactured by

Moser Rides S.R.L.

WARNING

Before attempting to operate this ride all persons must read and understand this manual and receive formal training on the ride. Only those people who have completed the training requirements and signed a statement that they have read and understood the Operations Manual and agree to operate the ride in accordance with the manual and the training may operate the ride with riders aboard.



The following maintenance manual is developed for the Park Model Free Whale/Flying Ace, built by MOSER Rides S.R.L. in compliance with applicable sections of ASTM F-770-93, standard practice for operation procedures for Amusement Rides and Devices. This operation manual also incorporates applicable sections of ASTM F-846 guide for testing performance of amusement rides and devices; F-853-93, standard practice for maintenance procedures for Amusement Rides and devices; F-115,9 practice for the design and manufacture of amusement rides and devices; and F-1193 practice for an amusement ride and device manufacturers' quality assurance program. Where necessary, this operation manual incorporates elements that go beyond the basic requirements of the applicable ASTM standards to provide the owner and operator with adequate data and information to safely and adequately operate the Free Whale/plane/Flying Ace.

The descriptions and figures contained in this handbook belong to Moser Rides and represent a technical reference which can be subject to modification at any time. The manufacturing firm, therefore, reserves the right to change mechanical parts, construction details, or single accessories without notice according to design modifications or commercial needs.

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1.0 SCOPE

This Operation Manual establishes the minimum requirements for the safe and correct operation of the Park Model, Free Whale/plane/Flying Ace manufactured by MOSER Rides S.R.L.

The Operators must be instructed on how to operate the ride under the following conditions:

- Operation under "normal" and "emergency" conditions.
- The maximum speed and maximum loads for the ride.
- Ride maximum cycle times and the frequency of reversals recommended by MOSER Rides S.R.L.

The Operator must inspect the ride every day and determine that it is ready to operate with riders

- All ride equipment is functioning (100% of seats and equipment working in the gondola) so that the riders will be safe and that there are no unusual or abnormal elements when the ride is operated.
- The Operator must inform the Owner if there is any non-conforming equipment.
- The Operator must not run the ride if it is not working in accordance with the Operation and Maintenance Manuals or if any safety equipment has been defeated or removed.

The Operator must never operate the ride if there is any unauthorized or untrained person standing in a dangerous position in or around the ride.

WARNING

Before attempting to perform maintenance on this ride all persons must read and understand this manual and receive formal training on the ride. Only those people who have completed the training requirements and signed a statement that they have read and understood the Maintenance manual and agree to operate the ride in accordance with the manual and the training may operate the ride with riders aboard.

2.0 APPLICABLE CODES AND STANDARDS

The input data, drawings and pictures of the equipment to be incorporated into the systems level manuals shall, at a minimum, comply with the requirements of the following codes and standards:

1. ASTM F698-94 Standard Specification for Physical Information to be provided for Amusement Rides and Devices.
2. ASTM F770-93, Standard Practices for Operation Procedures for Amusement Rides and Devices.
3. ASTM F846-92, Standard Guide for Testing Performance of Amusement Rides and Devices.

4. ASTM F853-93, Standard Practice for Maintenance Procedures for Amusement Rides and Devices.
5. ASTM F1159-94, Standard Practice for the Design and Manufacture of Amusement Rides and Devices.
6. ASTM F1193-88, Standard practice for an Amusement Ride and Device Manufacturer Quality Assurance Program.
7. DIN 4112, Temporary structures, fairground amusements, directives for dimensioning and construction, 1983.
8. DIN 15018, Cranes; principles for steel structures, stress analysis, 1974.

3.0 MANUFACTURER RESPONSIBILITY

MOSER Rides S.R.L. is providing the following information for the maintenance of the Park Model Free Whale/ Flying Ace. These requirements, recommendations and information are to be used by the Owner / Operator Technician to implement the Owner / Operator responsibility section of this manual. Whenever appropriate the MOSER Rides S.R.L. has provided information that they deem essential for the owner/Maintenance Technician responsibility sections.

SPECIAL NOTE:

The Maintenance Manual is intended to be read and understood by persons with at least a High School level in reading and comprehension and a basic level of technical skills related to electronics or mechanics. Moser Rides S.R.L. has, to the greatest degree possible, provide operating instructions accompanied with sequential, descriptive drawings, sketches or tables to show normal and emergency maintenance requirements and actions. The use of technical or industry jargon has, to the greatest extent possible, been avoided. Special words or phrases are defined as they are used in this manual.

3.1 DESCRIPTION-FREE WHALE/FLYING ACE

The Free Whale/Flying Ace is a FAMILY swing type ride with a single swinging gondola themed in the shape of a happy whale or a cheerful biplane with Snoopy as the WWI flying ace riding atop the wing. The attraction stands 12 ft. 11-3/4 in. (3.994 m.) from the platform or the ground to the top of the decoration on the swing pivot. The distance from the highest point of a swing seat to the ground is 13ft.6in. (4.2 m.). The Free Whale/Flying Ace has four (4) seats in sets of two facing each other. The ride can accommodate up to sixteen (16) adults weighing up to a total of 2640 lbs. (1200 Kg.), or twenty-four (24) children weighing up to 2165 lbs. (984 Kg.) or a combination of adults and children.

The Free Whale/Flying Ace swings from a central bar connecting two A-shaped swing structures. The whale/ plane gondola is attached at the top of the connecting bar and swings from a vertical to plus or minus 65 degree angle forward and back, powered by an electric motor. Riders sit facing each other in two sets of parallel seats positioned near the center of the whale/plane gondola. The swinging effect gives riders the sense of skimming through the air like a whale skims through the water, leaping and free falling at the point of change of direction,



Photo by David C. Althoff, Jr.

Figure 3.1-1



Photo by David C. Althoff, Jr.

Figure 3.1-2

or a plane soars through the air. The speed of the swing is regulated by an electric motor and gear box which drives a pneumatic tire against a drive plate on the bottom of the gondola. When the drive wheel stops, or if anything fails, the gondola glides to a stop.

The motion of the ride is both vertical and horizontal planes. Every person remains in a seated position and is restrained by a variable position lap bar system that can accommodate both children and adults.

The Free Whale/Flying Ace Data Plate for installations in the United States contains the following information:

RIDE NAME:	FREE WHALE/FLYING ACE
RIDE MANUFACTURER:	MOSER RIDES S.R.L.
PLACE OF MANUFACTURE:	OSTIGLIA, ITALY
RIDE SERIAL NUMBER:	
DATE OF MANUFACTURE:	MONTH , YEAR
NUMBER OF PASSENGERS:	16 ADULTS OR 24 CHILDREN MAXIMUM
MAXIMUM WEIGHT PER SEAT:	660 LBS (300 KG.).
MINIMUM RIDER HEIGHT:	42 INCHES, UNACCOMPANIED
MAXIMUM LOAD/ANCHOR PAD:	13491 LBS. (6600 KG.)
ELECTRICAL POWER	8 KW FOR THE DRIVE, 4 KW FOR THE LIGHT

When fully assembled, the Free Whale/Flying Ace structure, platform, transformer, transmission, air compressor, electrical cabinet and gondola weighs 11,851 pounds (5400 Kg).

The Free Whale/Flying Ace is made up of the following major elements or assemblies:

- PLATFORM ASSEMBLY
- A-FRAME ASSEMBLY
- DRIVE ASSEMBLY
- GONDOLA ASSEMBLY WITH HANGARS
- ELECTRICAL CABINET
- OPERATOR CONTROL CONSOLE

See Figures 3.1-1 and 3.1-2 for views of the Free Whale/Flying Ace.

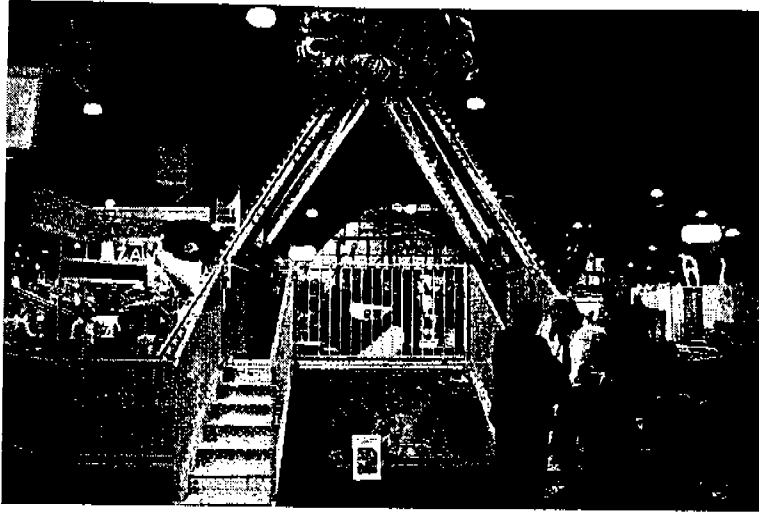


Photo by David C. Althoff, Jr.

Figure 3.3-1. Platform Entrances

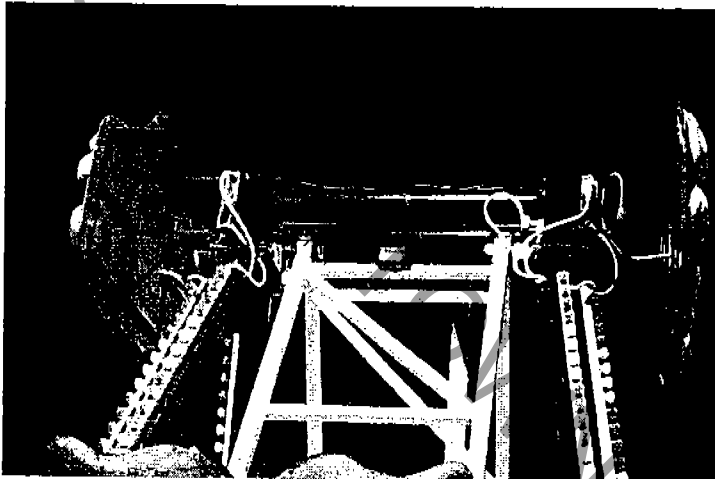


Photo by David C. Althoff, Jr.

Figure 3.3-2. A-Frame and Whale attachment



Photo by David C. Althoff, Jr.

Figure 3.3-3 Gondola seats

3.2 OPERATION

The Free Whale/Flying Ace is designed to be operated by a single Ride Operator. The OCC is installed so that the Ride Operator has a clear view of the Riders on the ride while it is in operation. The position of the OCC allows the single operator to control the Entry and Exit Gates and the Loading and Unloading of the Riders.

3.3 SUBSYSTEM FUNCTIONS

The function and associated assemblies of each subsystem will be described separately. However they must all work together for normal and safe operation of the Free Whale/Flying Ace.

3.3.1 STAIRS AND PLATFORM ASSEMBLY

The base, stairs, and platform assembly consists of a specially designed frame, elevated to 1.29 meters with four legs that anchor the ride to the ground. Two sets of stairs permit riders to mount to the platform for entering and exiting the ride. Entry and exit gates are mounted at the top of the stairs. Stairs and platform are covered in non-slip flooring. Railings surrounding the ride protect the air compressor, transformer, and electric drive motor located under the ride. Some park units may be set at ground level with a pit under the gondola, in which case, there will not be any stairs for the riders to use, and the gates will be at ground level. See Figure 3.3-1.

3.3.2 A-FRAME ASSEMBLY

The Double A-shaped Tower Assembly is the main structural support for the Free Whale/Flying Ace. Four legs are anchored to the ground to provide stability to the structure and support for the swing. The structure consists of two sets of two upright supports held together by a steel cap at the top and separated by the steel bar that separates the sets and provides a pendulum axle for the whale/plane gondola hangars. Connecting struts of the A-Frame are mounted 6 meters apart at the bottom and 3.075 meters apart from front to back. The whale/plane is suspended on rigid hangers mounted to the top connecting rod of the A-Frame bars and connected with two bolts on one side and a pin on the other so as to hold the whale/plane in place between the A-frames. See Figure 3.3-2.

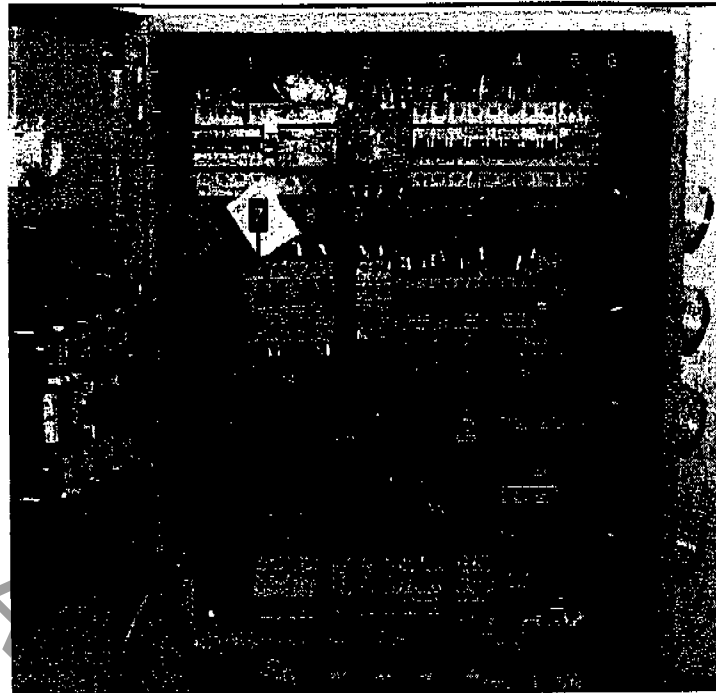


Figure 3.3.4. Electrical Light Panel

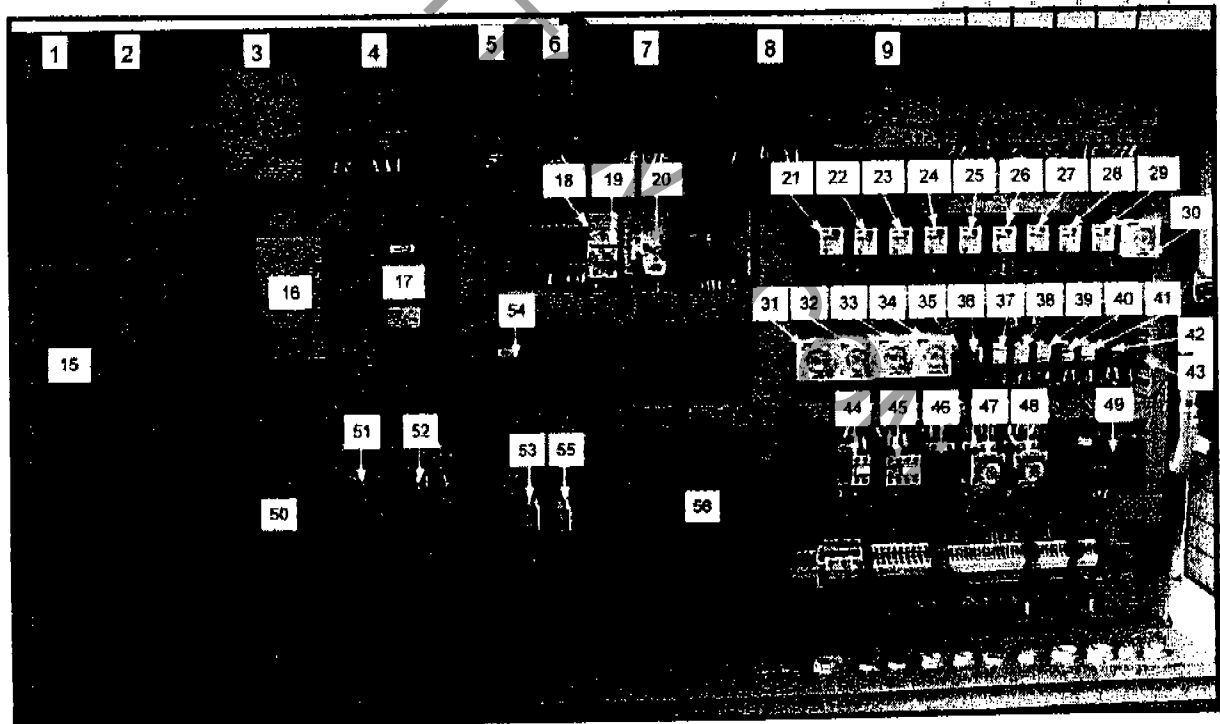


Figure 3.3.5. Main Electric Panel

3.3.3 DRIVE ASSEMBLY

The Free Whale/Flying Ace has two tachometers, one located on the DC motor and one on the pendulum axle. The tachometer on the motor determines the output shaft speed of the motor. When the operator activates the ride START, the tachometer generates a voltage proportional to the speed of the shaft rotation. When the ride begins, the tachometer on the headframe measures the speed of the swing of the whale/plane and compares and synchronizes the rotational speed and direction of the pendulum with the speed of the drive wheel. The electrical controls for the motor include a DC controller with regenerative braking. The Controller adjusts the rotational speed and direction of the motor so that there is no chirp when the keel of the whale/plane contacts the drive wheel tire. It steps up the speed of the drive wheel to increase the swing up to the maximum 65 degrees. Limit switches detect normal and overswing and allow the ride to accelerate, decelerate and stop without requiring any action by the Operator. If an overswing is detected, the motor controller shuts down (Fail to safe).

3.3.4 GONDOLA ASSEMBLY

The gondola has two sets of facing seats molded into the Gondola. The restraint system for all of the four seats is an adjustable lap bar, released by electric solenoid valve activated from the Operator's Control Console. See Figure 3.3-3.

3.3.5 ELECTRICAL CABINET

The Electrical Cabinet can be located adjacent to the Electric Drive Unit or at a convenient location that allows access for maintenance. The Electrical Cabinet houses the system circuit breakers, terminal blocks and connectors needed to operate the ride. A complete set of electrical drawings is reprinted in the Free Whale/Flying Ace Maintenance Manual. Care should be taken to make sure the cooling air inlet and outlet ports are not covered or obstructed. A power transformer may be located at or near the Electrical Cabinet in some installations. The transformer takes the available building 3 phase power and either boosts or drops it to 380 VAC for operation of the ride. See Figures 3.3.4 and 3.3.5. The electrical schematics are provided in Appendix A.

3.3.6 OPERATOR CONTROL CONSOLE

There is one (1) Operator Control Console (OCC). The OCC operates the ride. The OCC is mounted on a pedestal and has a cable that runs to the Electrical Cabinet (Figures 3.3-6 and 3.3-7). The OCC controls have the following functions for both Operator and Maintenance controls :

RIDE READY	Indicator light shows when ride is ready to be operated.
POWER OFF/ON	Key switch turns on power to the ride
LIGHTS #1:	ON / OFF SWITCH with internal INDICATOR LIGHT allows the Operator to turn ON the Light Group #1.
LIGHTS #2:	ON / OFF SWITCH with internal INDICATOR LIGHT allows the Operator to turn ON the Light Group #2.



Photo by David C. Althoff, Jr.

Figure 3.3-6 Operator Control Console Position

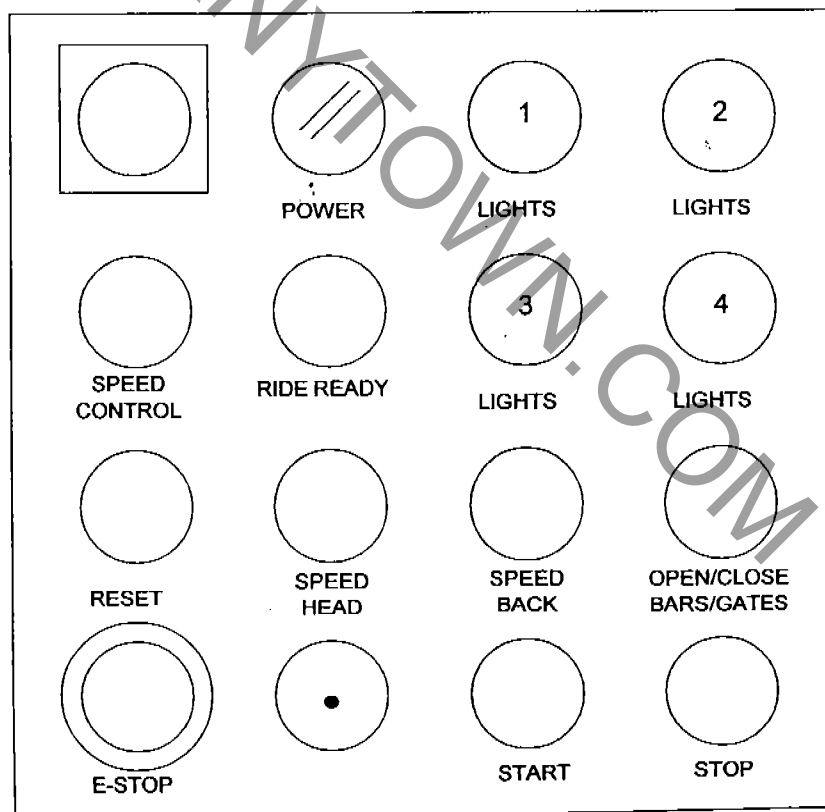


Figure 3.3-7 Operator Control Console panel showing manual maintenance controls for speed head and speed back.

- LIGHTS #3: ON / OFF SWITCH with internal INDICATOR LIGHT allows the Operator to turn ON the Light Group #3.
- LIGHTS #4 ON / OFF SWITCH with internal INDICATOR LIGHT allows the Operator to turn ON the Light Group #4.
- SPEED CONTROL: Dial allows control of the ride speed.
- SPEED HEAD: Controls speed of whale/plane head going forward (maintenance).
- SPEED BACK: Controls speed of whale/plane going backward (maintenance)
- OPEN CLOSE BARS/GATES: Handle allows platform gates to be opened and closed.
- START: GREEN PUSH BUTTON Allows the Operator to START the ride cycle.
- STOP: BLUE PUSH BUTTON allows the Operator to STOP the ride any time after the ride has been started.
- "E" STOP: PUSH/PULL BUTTON Puts the part of the ride into an Emergency Stop condition.
- RESET: PUSH BUTTON Allows the Operator to RESET the ride program following an "E" STOP or a FAULT is cleared from the system.

The OCC need not be fastened to the floor and can be positioned for optimum view and control of the ride. It should be positioned to allow the Operator to see the ride when it is operating and to control the entry and exit of Riders.

3.3.7 MAINTENANCE CONTROLS

The Maintenance Controls are built into the Operator's Control Console. They include:

1. SPEED HEAD: PUSH BUTTON: Allows the technician to move the gondola forward manually.
2. SPEED BACK: PUSH BUTTON: Allows the technician to move the gondola backward manually.

3.4.0 OPERATION

3.4.1 FUNCTIONAL DESCRIPTION OF OPERATION

The Free Whale/Flying Ace is designed to be operated in the AUTOMATIC mode when open to the public. During normal operation the Operator can select or change the timing on the timer to increase or decrease the ride cycle time.

1. The Operator OPENS the Load Gate electrically and allows up to sixteen (16) adults or twenty-four (24) children to enter the ride.
2. The Riders are seated on the facing seats.
3. The riders pull down the adjustable lapbar.
4. The Operator closes the self-adjusting lap bar by pressing the open/close bars/gates button on the operator control console. The operator then checks to make sure the lap bar is properly DOWN and LOCKED securely.
5. The Operator checks the Operator Control Console (OCC) to see that there are no FAULT indications.
6. The Operator presses the START button and the whale/plane begins to swing at a preset speed in an increasing arc to its full height of 19.42 feet (5.974 meters).
7. When the whale/plane reaches the height of its arc, it begins a steady decline in arc height..
8. The Gondola is brought to a final Stop at the Load / Unload position at the end of the ride cycle.
9. The Operator turns the OPEN/CLOSE BARS/GATES switch to open the lap bars.
10. The operator manually OPENS the EXIT gate and the Riders exit the ride.
11. The Operator closes EXIT GATE after all riders have left the ride.

3.4.1.1 DESCRIPTION OF MOTION DURING OPERATION

The whale/plane-shaped gondola swings back and forth in a single plane to a maximum height of 19.42 feet (5.974 meters), an arc angle of 130 degrees.

3.4.2 DESCRIPTION OF MOTION-MAINTENANCE

The motion of the Free Whale/Flying Ace when the Maintenance Mode is activated is limited to SPEED HEAD and SPEED BACK movements. No programmed motion is available in the Maintenance Mode.

3.4.2.1 DESCRIPTION OF RECOMMENDED PASSENGER LOADING

The loading of the Free Whale/Flying Ace does not require load balancing. Riders can sit anywhere on the seat row as long as they meet the height and weight requirements of the ride. The Free Whale/Flying Ace has the following height and weight restrictions:

MINIMUM HEIGHT	42 inches, unaccompanied
MAXIMUM HEIGHT	None
AVERAGE WEIGHT	165 pounds (75Kg) per passenger

Heavier Riders can be accommodated, but the total maximum weight for the passenger load must not be more than 660 pounds per seat. This may mean that one seat is unoccupied if several heavier Riders want to ride at the same time.

No more than four (4) adult or six (6) children riders are allowed on a seat. All riders on Free Whale/Flying Ace must be able to support their upper body unassisted. Riders who appear to be under the influence of alcohol or drugs shall not be allowed to ride on the Free Whale/Flying Ace. Riders who have back problems, high blood pressure, heart conditions or are pregnant shall not be allowed to ride on Free Whale/Flying Ace. Persons who cannot be properly held by the Lap Bar because of a handicap shall not be allowed to ride on Free Whale/Flying Ace.

3.4.2.2 DESCRIPTION OF OPERATOR CONTROL ACTIONS

The following is a description of the controls and indicators on the OCC of the Free Whale/Flying Ace.

"E" STOP:	PUSH/PULL BUTTON Puts the part of the ride into an Emergency Stop condition.
FAULT:	INDICATOR LIGHT Tells the Operator that there is some sort of system "FAULT" and the ride is STOPPED.
LIGHTS #1:	ON / OFF SWITCH with internal INDICATOR LIGHT allows the Operator to turn ON the Light Group #1.
LIGHTS #2:	ON / OFF SWITCH with internal INDICATOR LIGHT allows the Operator to turn ON the Light Group #2.
LIGHTS #3:	ON / OFF SWITCH with internal INDICATOR LIGHT allows the Operator to turn ON the Light Group #3.
LIGHTS #4:	ON / OFF SWITCH with internal INDICATOR LIGHT allows the Operator to turn ON the Light Group #4.
START:	PUSH BUTTON Allows the Operator to START the ride cycle.

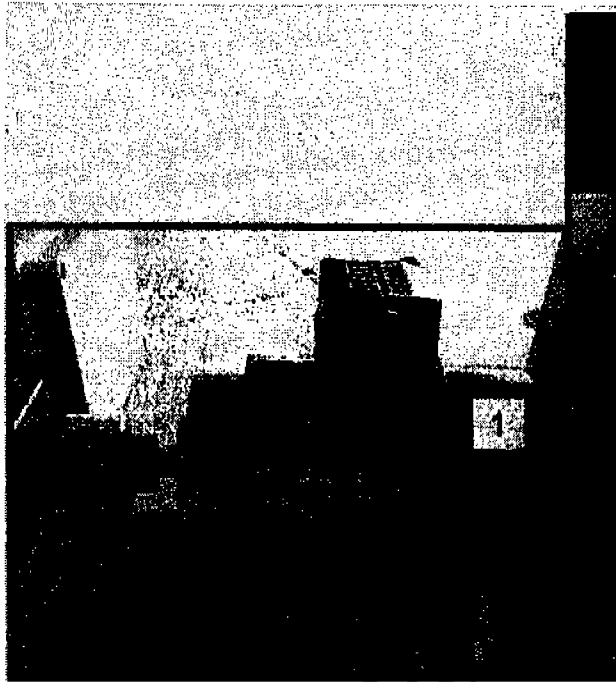


Figure 3.4-1. Tachometer and Gear Box reducer (3-4.2) are mounted to the axle that holds the gondola hangers and regulate the speed of the gondola.

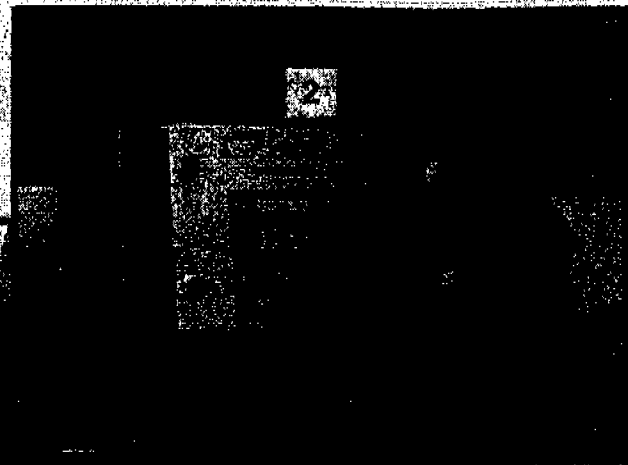


Figure 3.4-2. Gear Box for Tachometer

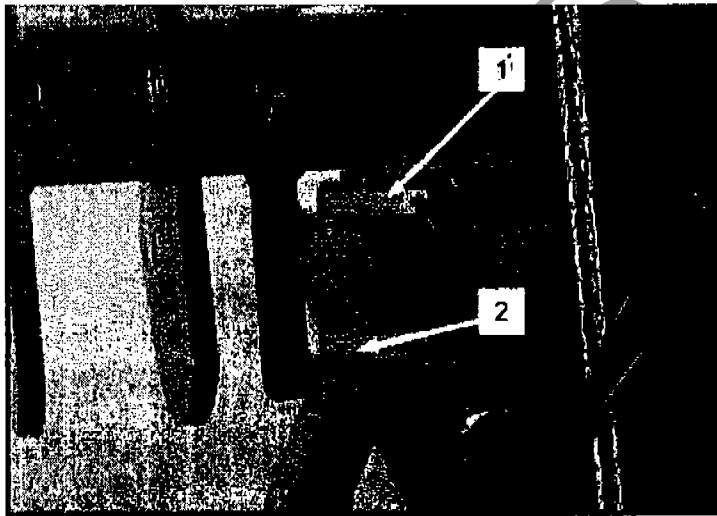


Figure 3.4-3. Limit Switches 1 and 2 are mounted on the axle outside of the Gondola hanger and are active when the gondola hangs in horizontal position.

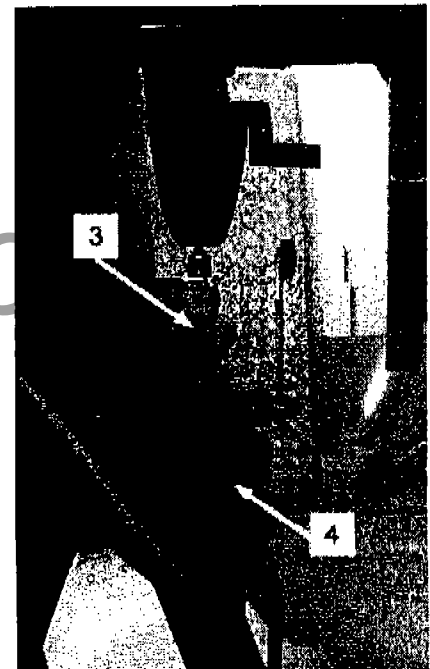


Figure 3.4-4. Limit Switches 3 and 4 regulate the highest position of the gondola swing and shut down the drive motor if the swing travels beyond 130 degree maximum.

- STOP:** PUSH BUTTON allows the Operator to STOP the ride any time after the ride has been started.
- SPEED CONTROLS:** Allow the Operator to control the forward and back speeds of the ride
- RESET:** PUSH BUTTON Allows the Operator to RESET the ride program following an "E" STOP.
- POWER:** TWO POSITION KEY SWITCH Allows the Operator to turn the ride ON or OFF.
- OPEN/CLOSE BARS/GATES:** SWITCH allows operator to open and close the entrance gates and lapbars.

For normal start-up operation of the ride the Operator should follow these steps:

1. Turn the POWER switch to the ON position
2. Press the RESET button.
3. Wait approximately 5 minutes to allow the system to become fully active and then the ride is ready for operation with passengers.

To run a ride for passengers the Operator should follow these steps:

1. Check to see that all passengers are properly seated and the lap bars are DOWN and LATCHED.
2. Press the START button.
3. The ride will begin and proceed through its cycle.

3.4.3 RECOMMENDED SAFETY PROCEDURES

The Free Whale/Flying Ace uses two tachometers to monitor the operation of the ride. The Free Whale/Flying Ace has two tachometers, one located on the DC motor and one on the pendulum axle. The tachometer on the motor determines the output shaft speed of the motor. When the operator activates the ride START, the tachometer generates a voltage proportional to the speed of the shaft rotation. When the ride begins, the tachometer on the headframe measures the speed of the swing of the whale/plane and compares and synchronizes the rotational speed and direction of the pendulum with the speed of the drive wheel. The electrical controls for the motor include a DC controller with regenerative braking. The Controller adjusts the rotational speed and direction of the motor so that there is no chirp when the keel of the whale/plane contacts the drive wheel tire. It steps up the speed of the drive wheel to increase the swing up to the maximum 65 degrees. Limit switches detect normal and overswing and allows the ride to accelerate, decelerate and stop without requiring any action by the Operator. If an overswing is detected, the motor controller shuts down (Fail to safe). See Figures 3.4-1 and 3.4-2, Tachometer, and Figures 3.4-3 and 3.4-4, Limit switches.

SAFETY NOTE

The most important safety device on any ride is a well trained Operator who is watching the ride and Riders at all times. The Operator is responsible for the safe operation of the ride.

The Safety Control System monitors the operation of the ride. Under the following conditions the Safety Control System will "E" STOP or RIDE STOP the ride at any time before the Gondola leaves the Load / Unload Platform or while it is moving in the ride cycle.

Once the lap bars are DOWN and LOCKED and the Gondola leaves the Load / Unload Platform, the restraints cannot be opened.

LOSS OF PRIMARY POWER	AUTOMATIC "E" STOP
RIDE EQUIPMENT FAILURE	AUTOMATIC "E" STOP
RIDE OVERTRAVEL FAULT	AUTOMATIC RIDE STOP
RIDE OVERSPEED FAULT	AUTOMATIC RIDE STOP
RIDE EQUIPMENT FAULT	AUTOMATIC RIDE STOP

The Ride Operator can also initiate a manual shut-down under the following conditions:

SERIOUS PASSENGER DIFFICULTY	OPERATOR INITIATED "E" STOP
PASSENGER DISCOMFORT	OPERATOR INITIATED RIDE STOP

WARNING

The "E" STOP is ONLY to be used in the event of a true EMERGENCY. The "E" STOP is not to be used to stop the ride operation under any other circumstance.

The following are the definitions of "E" STOP and RIDE STOP for the Free Whale/Flying Ace:

"E" STOP: When either an automatic or operator-initiated "E" STOP condition is activated, the ride power shuts down and the ride glides to a stop in the normal upright position. This allows the Operator to evaluate the problem and take appropriate action. To clear an "E" STOP, the Operator pulls OUT on the "E" STOP button and pushes the ALARM RESET button. Resetting the "E" STOP will NOT RESTART THE RIDE in the AUTOMATIC mode. Once the "E" STOP is cleared, the Gondola MUST be cycled through a normal ride cycle WITHOUT Riders to verify normal operation before Riders are allowed to re-enter the Gondola.

RIDE STOP: Any stop on the Free Whale/Flying Ace will cause the gondola to stop at the normal load/unload position.

3.4.4 PASSENGER RESTRAINT SYSTEM

Each seat has a continuously adjustable lap bar. In an emergency, the lap bar is released in the same way as in normal operation. In normal operation the lap bars are OPEN when the Riders enter the seats. The ride MUST NOT be started if any lap bar is OPEN. The passengers pull the lap bars down and the Operator checks the restraints to make sure they are fully CLOSED and LATCHED. When the gondola returns to the (Load / Unload) position, the lap bars can be released by the Operator.

3.5 DESCRIPTION OF RECOMMENDED SET-UP

The Free Whale/Flying Ace is a Park Model and is to be set-up under the supervision of the manufacturer or their authorized representative.

3.5.1 ANCHOR PADS (4)

Prepare pit and Anchor Pads per specifications for the individual ride. The A-Frame posts are anchored to, reinforced concrete pads with a thickness of not less than 8 inches (20.3 cm). The Frame is anchored by means of four (4), 1 inch diameter, high strength anchors at each of the four (4) support columns. The anchors may be either chemical anchors installed in accordance with the applicable International Conference of Building Officials (ICBO) Report or a pre engineered series of anchors embedded in the concrete when it is poured. The A-Frame Assembly must be leveled during installation.

3.5.2 PREPARE PIT

If ride is installed flush with the ground, prepare pit beneath it, to plans engineered by a local engineer to comply with loads provided in this manual, to accommodate drive unit and compressor. Pit is 1.875 meters front to back, 3 meters wide and 1 meter deep. Stairs at back are 1.5 meters deep. Platform, if used, is 27 ft. 8-3/4 in. long, 11 ft. 5 inches wide and sits 4 ft. 2-1/4 in. high. Entry and exit stairs are attached to the platform. The platform and stairs are made of non-slip steel tread.

3.5.3 A-FRAME ASSEMBLY

Bolt all four legs and tub hangers to top assembly, then lift into position with crane. Bolt legs to anchor pads and connect electrical connectors. The top assembly is attached to the A-frame legs with eight (8) bolts, washers and nylon locknuts on each side. Lighting connectors, connectors for the Tachometer signal and limit switches are attached to the top assembly. The tachometer is attached to one end of the axleshaft. The decorative sign is attached to the end of the A-Frame top assembly as well. See Figures 3.5-1 and 3.5-2.



Figure 3.5.1. A-Frame Assembly



Figure 3.5-2. A-Frame Assembly

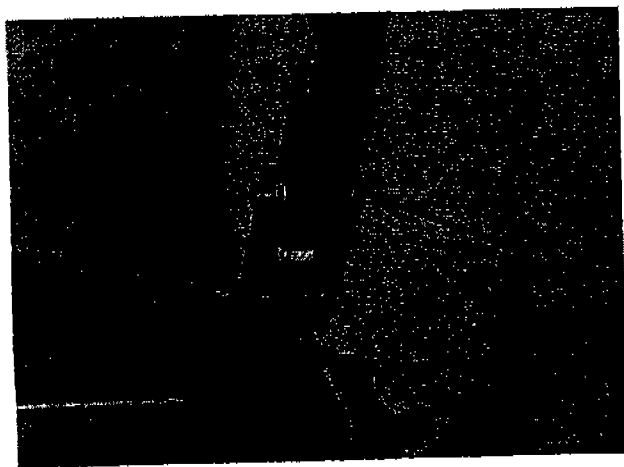


Figure 3.5.3. Gondola attachment to tub hanger.

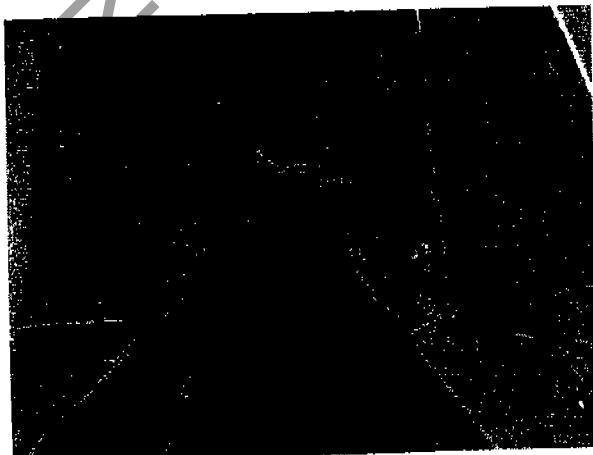


Figure 3.5-4. Axle attachment to Tub hanger.

3.5.4 TUB HANGERS

Two tub hangers attach to the top assembly and to the front and back of the gondola respectively. The hanger fits between and bolts to connections on the gondola tub (Figure 3.5-3). At the top of the ride, hangers attach to a mounting ear that mounts to the top axle (Figure 3.5-4) One hanger attaches with 2 bolts, washers and nylon insert locknuts. The other attaches with a pin, washer and nylock.

3.5.5 DRIVE UNIT AND COMPRESSOR

Install drive unit and compressor under the ride per manufacturer's specifications. See Figure 3.5-5. The electric motor powers the drive shaft which turns the drive tire against the keel of the gondola to push it up to a maximum of 65 degrees. See Figures 3.5-6 and 3.5-7. The Controller adjusts the rotational speed and direction of the motor so that there is no chirp when the keel of the whale/plane contacts the drive wheel tire. It steps up the speed of the drive wheel to increase the swing up to the maximum 65 degrees. Limit switches detect normal and overswing and allows the ride to accelerate, decelerate and stop.

3.5.6 GONDOLA

Attach the gondola to lower ends of the hangers and connect electrical connections to the gondola. The hangers attach to left and right sides of the gondola, front and back with two bolts, washers and nylocks on one side and with a pin, washer and nylock on the other.

3.5.7 ATTACH ELECTRIC

Connect electric lights, compressor and drive motor, and all electric cables per electrical diagrams in attachment A. Set up Operator Control Console and attach electric. Test all electrical connections. The ride is ready to operate.

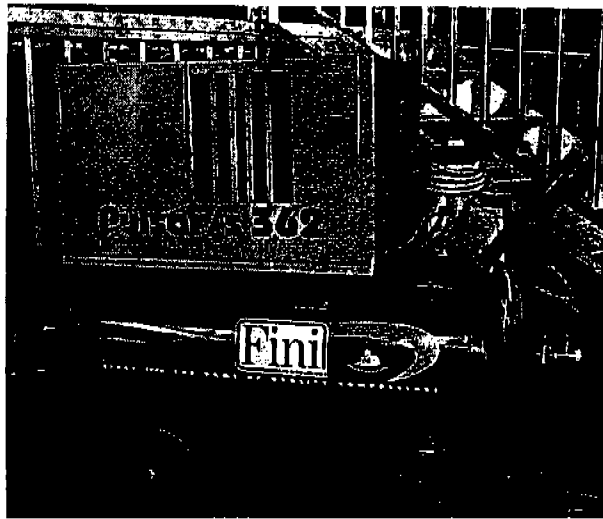


Figure 3.5-5. Position the compressor installation below the ride.

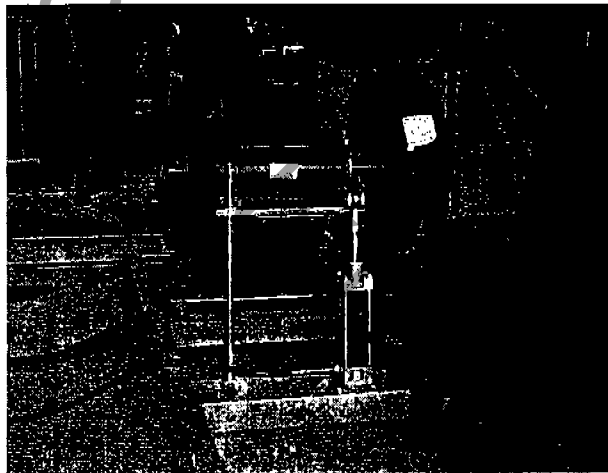


Figure 3.5-6. Drive unit

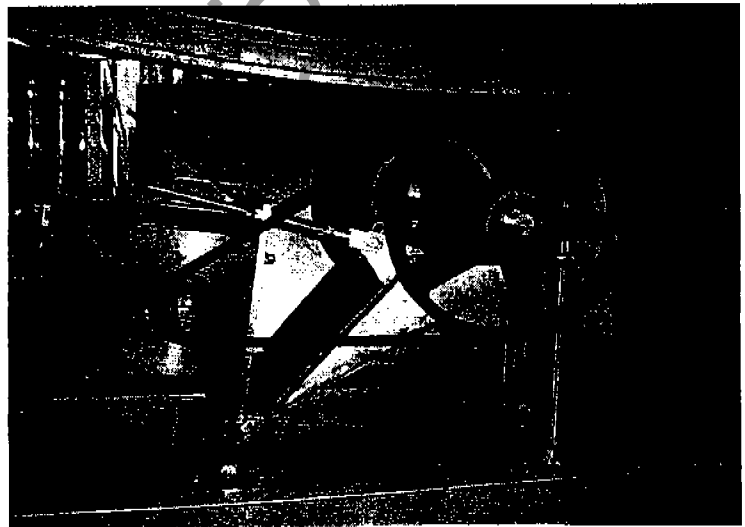


Figure 3.5-7 Drive Unit, side view

3.7 RECOMMENDED LUBRICATION

The Free Whale/Flying Ace is a sophisticated ride. To assure safe and reliable operation, the ride requires special attention to proper lubrication at specified intervals. The Owner/Operator must follow the requirements and specifications of the lubrication section. Failure to use the required lubricants and procedures could cause premature wear or failure of the Free Whale/Flying Ace and void the warranty.

3.7.1 RECOMMENDED TYPES OF LUBRICANT

The types of lubricants can be used in the designated locations on the Free Whale/Flying Ace are listed in Table 3.7.1.

3.7.2 RECOMMENDED FREQUENCY OF LUBRICATION

The Free Whale/Flying Ace requires that a periodic, preventive maintenance, lubrication schedule be maintained. Section 3.7.3 of this manual tells where the lubrication points are and when and how they are to be lubricated.

3.7.3 LUBRICATION POINT LOCATIONS

Using a grease gun with a flexible hose and zerk fitting connection, and using an approved grease shown in Table 3.7.1 of this manual, carefully grease all grease fittings on all moving parts of the machine.

3.7.3.1 DAILY

Before opening the ride each day, lubricate the axle shaft and the drive wheel axle as shown in Figures 3.7-1 and 3-7.2.

3.7.3.2 WEEKLY

The following locations on the Free Whale/Flying Ace need to be lubricated every week ride is in operation with one of the approved lubricants listed in Table 3.7.1 of this manual, using the special greaser when indicated. Lubricate the lap bar and motor support as shown in Figures 3.7-3 and 3.7-4. Check the compressor oil level weekly and replenish as needed (Figure 3.7-5).

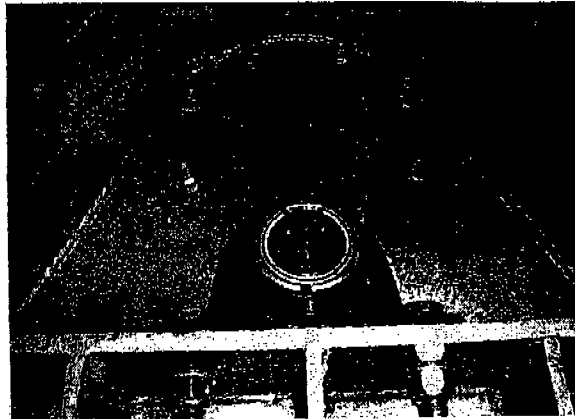


Figure 3.7-1. Daily, before opening the ride, lubricate the axle shaft at the point shown by the arrow

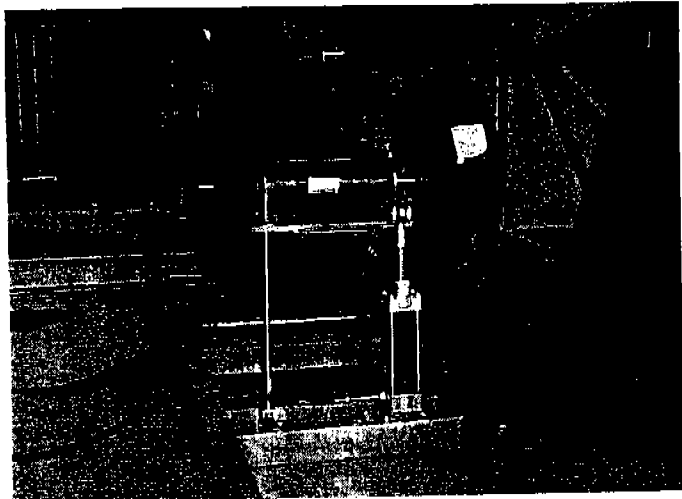


Figure 3.7-2. Daily, before opening the ride, lubricate the drive wheel axle at the location shown by the arrow

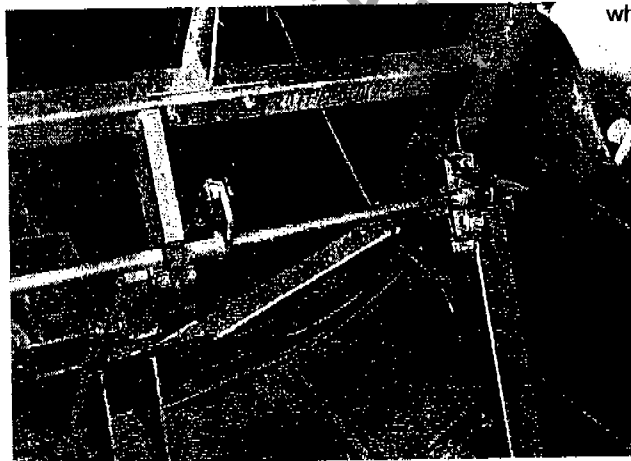


Figure 3.7-3. Each week, carefully lubricate the lapbar at the point indicated by the arrow.



Figure 3.7-4. Each week, lubricate the motor support

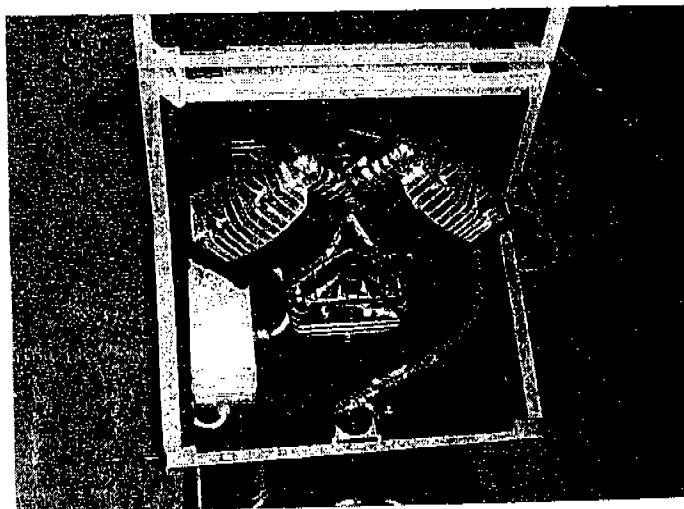


Figure 3.7-5. Each week, check the compressor oil level and replenish as needed.

Table 3.7.1 Recommended types of Lubricant

AGIP	AGIP Grease GR MU EPN*2	
GULF	GULF CROWN Grease #2	-30 C +120 C
GULF	GULF LUBCOTE #2	+120°C +60°C
MOBIL	MOBILUX2	-35 C +130 C
MOBIL	MOBILITAC81	-30 C +120 C
IP	IP Alvania R2	-30 C +130 C
IP	IP Cardium Fluid D	-20 C +60C
IP	IP Fluid 12	-30 C +60 C
TEXACO	Multifak 2	-20 C +120 C
TEXACO	Crater 2X Fluid	-20 C +120 C
VALVOLINE	Valvoline LB-2	-20 C +120 C
VALVOLINE	Valvoline Dipper stick	-20 C +220 C
ARAL	ARAL HL12	-30 C +130 C
ARAL	ARAL Sint FZ-12	-20 C +80 C
ARAL	ARAL LFZ	-20 C +200 C
BP	BP ENERGREASE LS2 BP	-30 C +120 C
BP	ENERBOL WRL	-20 C +80 C
CASTROL	CASTROL SPHEEROL AP2	-20 C +130 C
CASTROL	CASTROL "SPHEEROL APT2Bei	-20 C +130 C
CASTROL	CASTROL GRIPPA 33 S	-20 C +80 C
CHEVRON	CHEVRON Dura-lith Grease 2	-25 C +125 C
CHEVRON	CHEVRON Pinion Grease MS	-20 C +125 C
ESSO	BEACON 2	-30 C +130 C
ESSO	SURRET Fluid 30	-30 C +60C

3.8 RECOMMENDED DAILY PRE-OPENING INSPECTIONS

In accordance with the requirement of ASTM F-853 The Owner / Operator is required to conduct a Daily Pre-Opening Inspection of the Free Whale/Flying Ace. The Free Whale/Flying Ace also has an Annual Acceptance Test Procedure (ATP) which is to be conducted during and after the ride is set-up for the first time in a season.

3.8.1 DAILY PRE-OPENING CHECK-LIST

The Free Whale/Flying Ace and its associated control systems MUST be given a complete and thorough inspection DAILY prior to operating the system with riders.

NOTE:

A DAILY PRE-OPENING INSPECTION Checklist, reflecting any special needs and concerns of the Owner / Operator should be developed from the following Moser Rides S.R.L. recommended Daily Inspection Procedure. The recommended inspections are considered a minimum for safe operation of "The System". The Owner/Operator is encouraged to expand the DAILY PRE-OPENING INSPECTION to reflect his own special needs and requirements.

3.8.1.1 STATIC (NON-OPERATING) VISUAL INSPECTION:

WARNING

The following inspections are to be accomplished with the Free Whale/Flying Ace, Main Power Switch located in the Electrical Cabin turned OFF with a LOCK-OUT applied. Failure to turn the Free Whale/Flying Ace OFF during this portion of the inspection could allow the Free Whale/Flying Ace to move unexpectedly and cause injury to the person conducting the inspection.

WARNING

No one is to be allowed to sit in the Free Whale/Flying Ace seats during this portion of the Daily Pre-Opening Inspection, except the person conducting the inspection, if required to check the seat or the Lap Bars.

DAILY PRE-OPENING INSPECTION

The Free Whale/Flying Ace must complete the following Daily Pre-Opening Inspection prior to carrying passengers:

1. **COMPRESSOR:** Drain the compressor tank to remove water that has accumulated from condensation overnight. See Figures 3.8-1 and 3.8-2. Visually check to make sure there is enough oil in the crosshead in the compressor. Check the pneumatic action of the crosshead.
2. Check the pneumatic cylinder on the drive wheel. See Figure 3.8-3.
3. **LAP BARS:** Release the Lap Bar Restraints to make sure they release and raise properly. See Figures 3.8-4, 3.8-5, and 3.8-6.
4. **LAP BARS:** Lower each Lap Bar until it stops as close to the seat as possible. Lap Bars are positioned based on the size of the largest rider on ant seat row. There is no latch pawl. Each seat row lap bar system is separate. There is no minimum or maximum opening requirement, but at a minimum height of 42 inches, the 50 percentile person's thigh is around four inches from the seat.
5. **SEATS:** Check the Seat to make sure there are no catch points or damage.
6. **BASE ANCHORS:** Check the four (4) A-Frame Base Anchors to make sure they are secure and in good condition.
7. **AXLE:** Check the A-Frame top axle connection to the connecting bar to make sure all fasteners are secure and in good condition.
8. **TACHOMETER:** Visually check the Tachometer on the side of the axle to make sure it is properly positioned and free of dirt or damage.
9. **HANGERS:** Visually check the hangers that hold the gondola. Make sure they do not wobble. Check the connection between the gondola and the hanger. See Figure 3.8-7 and Figure 3.8-8.
10. **DRIVE TIRE:** Check air pressure in the drive tire.

3.8.1.2 FUNCTIONAL (EQUIPMENT OPERATING) INSPECTION

WARNING

The following inspections are to be accomplished with "The System" power switch located in the Electrical Cabin turned ON. During this portion of the inspection some or all of the FREE WHALE/FLYING ACE could move unexpectedly. The person conducting the inspection must stay CLEAR of the motion envelope when testing the FREE WHALE/FLYING ACE. To avoid potential injury EXTREME CAUTION MUST BE TAKEN!!!!



Figure 3.8-1. Before opening the ride, daily purge the tank of the air compressor using the valve indicated by the arrow

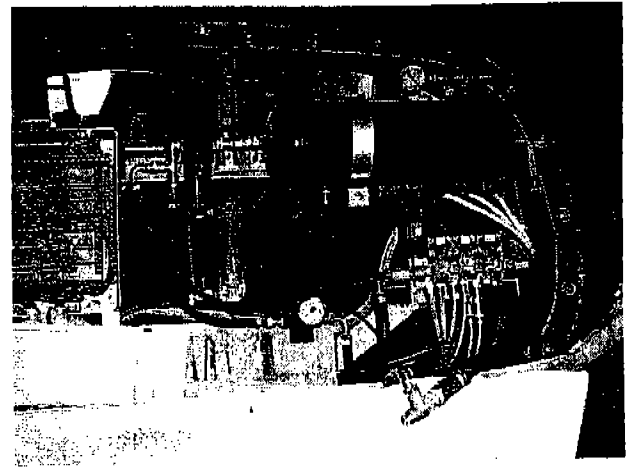


Figure 3.8-2. Before opening the ride, daily purge the air tank by using the valve indicated at the arrow.

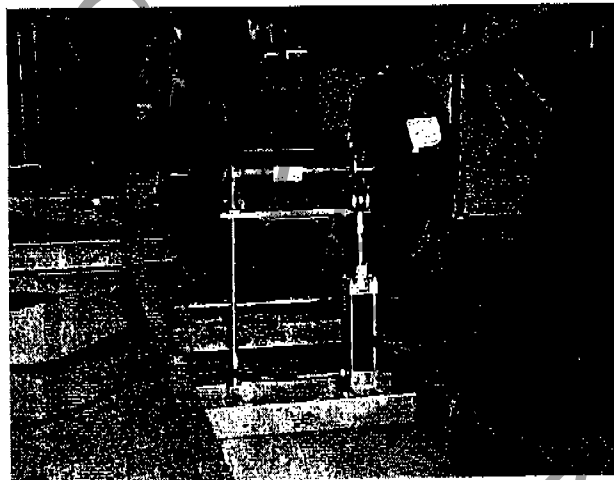


Figure 3.8-3 Before the ride opens daily, check that the pneumatic cylinder is functioning properly on the pneumatic drive wheel. Weekly, check the belt tension on the speed reducer attached to the DC motor.

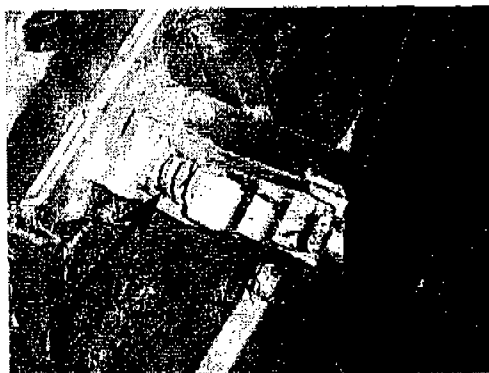


Figure 3.8-4. Before the ride opens daily, check all components of the lap bar system to make certain it works properly. Check that all bolts are tight and make sure there is no excessive wear.



Figure 3.8-5. Lap bar system

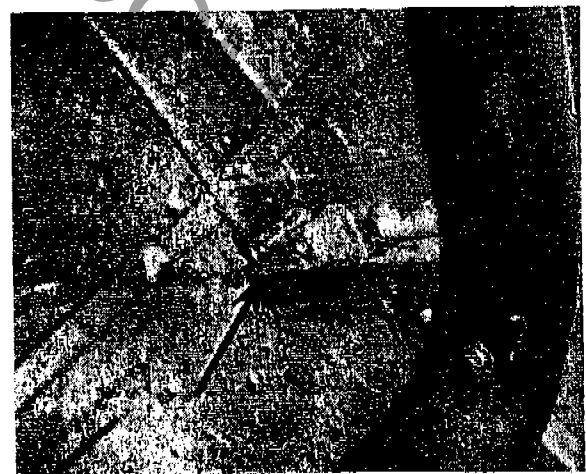


Figure 3.8-6 Lap Bar system components.

WARNING

No one is to be allowed to sit in any of the Free Whale/Flying Ace seats during the Daily Pre-Opening Inspection.

Once the visual inspection has been completed, remove the Lock-Out from the Master Power Switch. Apply power to the FREE WHALE/FLYING ACE by turning ON the Master Power Switch. Start-up the electric power and allow the compressor to run for a minimum of 5 minutes.

10. SWING CHECK: Turn the ride ON and place the ride in the MANUAL MODE. press the head speed and then the back speed to make sure the ride swings easily and evenly without overswinging.
11. RIDE OPERATION: Run the ride in a normal ride cycle. Listen for any unusual noises or vibration. Check the cycle time to make sure it has not changed.

RECOMMENDED WEEKLY CHECKS

The following weekly checks are recommended for the Free Whale/Flying Ace

1. Check the tension of the transmission belt on the speed reducer attached to the D. C. motor. See Figures 3.8-3 and 3.8-9.
2. Check the bolts at the top of the A-Frame Assembly. See Figures 3.8-10 and 3.8-11.
3. Check the bolts at the swing shaft of the cross head assembly. See Figure 3.8-12.
4. Check the bolts on the lap bar See Figure 3.8-13.
5. Check the bolts at the base of the A-Frame. See Figure 3.8-14.
6. Check the ring tension on the swing shaft. See Figure 3.8 15.

RECOMMENDED MONTHLY CHECKS

It is necessary to replace certain bolts on important parts of the ride periodically. The frequency of the replacement comes from experience and from a careful visual check. The quality of the bolts must be equal to the bolts removed. The replacement bolts and fastener components must match the characteristics of the connection before. Diameter, thread pitch, grade of fastener and the torquing must be in accordance with the ride manufacturer's drawings and specifications.

The connection is to be accomplished using a torque wrench that allows installation of the fasteners at the proper torque level.

Check crosshead oil in the compressor. If necessary, change the filters. Clean the filter on the motor. Check brushes for excess wear.



Figure 3.8-7. Check the connection between the gondola and each gondola hanger daily. Make sure all bolts are tight and there is no excessive wear.



Figure 3.8-8. Check the connection between the gondola hanger and the top assembly daily

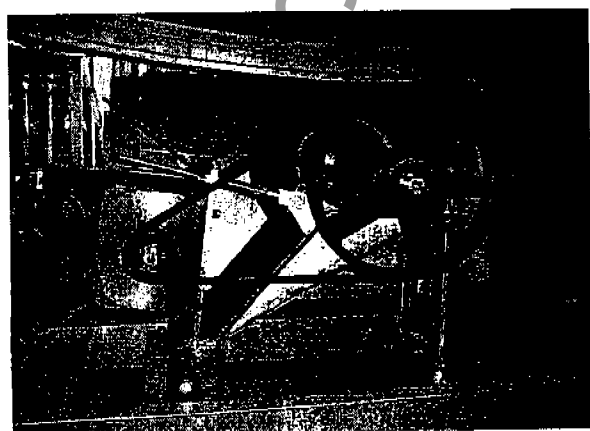


Figure 3.8-9. Check the tension of the transmission belt on the speed reducer drive to the DC motor weekly.



Figure 3.8-10. Check the bolts at the top of the assembly.

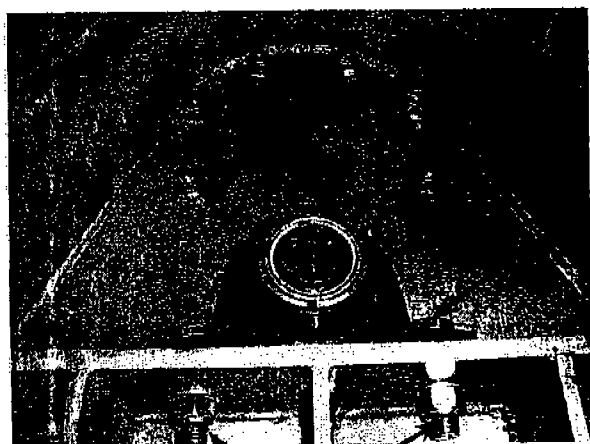


Figure 3.8-11. Check the bolts where the swing shaft axle is attached to the top assembly.

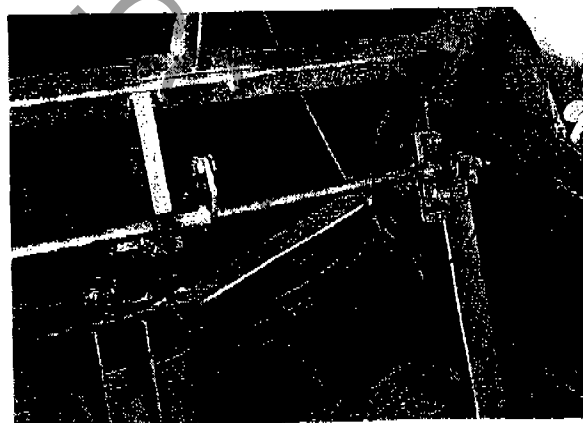


Figure 3.8-12. Check the bolts on the lap bar assembly.

3.8.2 DAILY POST CLOSING CHECK-LIST

The Owner / Operator should conduct a daily closing check of the Free Whale/Flying Ace to determine if something needs repair over night or during the shut-down period.

NOTE:

A DAILY POST-CLOSING INSPECTION Checklist, reflecting any special needs and concerns of the Owner / Operator should be developed from the following Moser Rides S.R.L. recommended Daily Inspection Procedure. The recommended inspections are considered a minimum for safe operation of "The System". The Owner/Operator is encouraged to expand the DAILY POST-CLOSING INSPECTION to reflect their own special needs and requirements.

1. OPERATIONAL CHECK: CLOSE all Lap Bars. Run a normal ride cycle and listen for any unanticipated noises and look for any unanticipated movements.
2. POWER SHUT DOWN: Turn OFF the breakers for the control of the ride in the Power Panel. Turn OFF the Main Power Switch in the Power Panel..

3.9 RECOMMENDED PERIODIC MAINTENANCE

The currently anticipated level of Daily, Weekly, Monthly and Annual Maintenance required for the Free Whale/Flying Ace are covered in the earlier sections of this manual. Moser Rides S.R.L. may, from time to time develop additional Maintenance Bulletins to define any additional periodic maintenance that is needed to keep the ride operating in a normal and safe manner.

3.9.1 RECOMMENDED WEAR LIMITS OR TOLERANCES

At this current time there are no special wear limits or tolerances that apply to the Free Whale/Flying Ace. The following recommendations are based on experience with similar rides.

3.9.1.1 HIGH STRENGTH BOLTS-REPLACE

The high strength bolts, nuts and washers used in the connection of the A-Frame, axle, and hanger connections of the Free Whale/Flying Ace should be replaced with NEW fasteners of the exact same specifications at the beginning of each operating season if corrosion is present. If no corrosion is present the high strength bolts, nuts and washers should be replaced every five (5) years. The old bolts, nuts and washers MUST be destroyed or rendered unusable. Use a good grade of anti-seize compound when installing the new bolts, nuts and washers,

3.9.1.2 DRIVE TIRE

The DRIVE TIRE must be replaced if the pneumatic tire becomes worn, nicked or cut. The maximum allowable wear on the tire is 1/8 inch (3.175mm) or a reduction in measured diameter of the wheel of ___ inches (___mm).



Figure 3.8-13. Weekly, check the bolts at the base of the A-Frame assembly

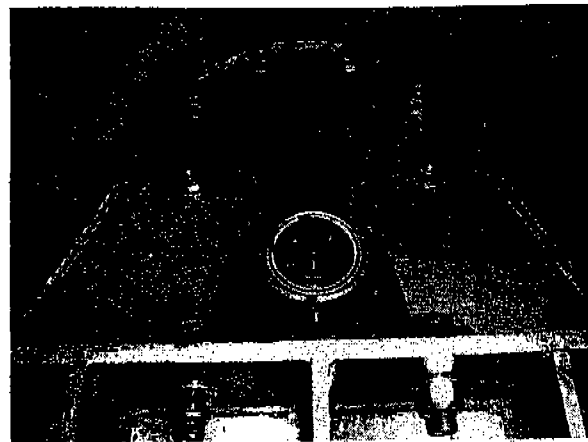


Figure 3.8.14. Weekly, check the ring tension on the swing shaft.

Figure 3.5.1 Torque Chart

FASTENER STRENGTH	8.8	10.9	12.0
METRIC THREAD ISO DIN 13	TORQUE (Nm)	TORQUE (Nm)	TORQUE (Nm)
M 10	45	67	80
M 12	78	117	138
M 14	126	184	220
M 16	193	279	360
M 18	270	387	485
M20	387	558	680
M22	522	747	885
M 24	740	954	1100
M 27	990	1395	1600
M 30	1350	1890	2200

3.9.2 RECOMMENDED PERIODIC OPERATIONAL TESTS

Each time the Free Whale/Flying Ace is setup in a new location, it should receive a thorough operational test. The operational test should include, but not be limited to, operating the ride for a minimum of six (6) ride cycles. When the START button is pressed at the beginning of each ride cycle, start a stop watch when the gondola leaves the Load / Unload position. When the gondola reaches the Load / Unload position stop a stopwatch. The cycle times for the ride cycle from start to finish of each of the six (6) ride cycles should be less than +/- 1 second. The Free Whale/Flying Ace should be tested operationally once a year at the beginning of each season to assure compliance with applicable State Codes and Standards in accordance with the Acceptance Test Procedure.

3.9.3 RECOMMENDED NON-DESTRUCTIVE TESTING

Visual Non Destructive Testing (NDT) of the welds and structure of the Free Whale/Flying Ace should be conducted at the beginning of each operating season. NDT using Magnetic Particle or X Ray inspections are not required at this time. Any components of equipment found to be questionable or unacceptable as a result of the visual NDT shall be replaced by approved spare parts. Any welds found to be in question as a result of the NDT inspection shall be reported to Moser Rides S.R.L. Moser Rides S.R.L. shall provide their recommended repair procedure or a certified welder to make or supervise the repair. Any welding repairs MUST be done by a welder, certified for working on the type of weld and the thickness of the material.

3.9.4 RECOMMENDED WATER TREATMENT

No water treatment is required for the Free Whale/Flying Ace.

3.9.5 REPLACEMENT FASTENERS SPECIFICATIONS

Fasteners used on this ride are classified as functional load-carrying fasteners if:

1. They are used as tension members in the operation of this ride.
and / or
2. They are required to resist shear through friction-type connections in the operation of this ride.

Fasteners are selected with consideration to grade, size, and quantity, using joint capacities based on tightness torques of 60% rated yield and group joint efficiencies of 62.5%.

3.9.5.1 TORQUE REQUIREMENTS

Fasteners must be tightened to the torque value listed in the torque chart (Figure 3.5-1). These values were selected to produce a tightening torque range of 60% to 70% of proof load, when tightened with a hardened washer under the nut or fastener head (whichever is accessible for tightening). When the fastener is tightened from the head end, apply anti-seize lubricant to the shank end of the fastener. When the threads are lubricated, use 10% less torque to tighten the fastener.

WARNING

DO NOT TIGHTEN Fasteners OVER THE RECOMMENDED TORQUE. This can damage the fastener, due to variances in coefficients of friction and torque wrench accuracy.

Always use a torque wrench. It is impossible to accurately measure the tightness of a fastener by other methods. Torque wrenches must be checked for accuracy once each year.

3.9.5.2 TORQUE CHART

Torques for functional load carrying cold finished hex head fasteners with dry rolled threads, used with locknuts (see note 3, below), and tightened with an ASTM A325 hardened washer under the fastener or locknut head (whichever is accessible for tightening). Figure 3.5-1 shows the standard Torque Chart for the Free Whale/Flying Ace. This torque range will develop 60% to 70% of proof load. Refer to Replacement of fasteners and locknuts for conditions requiring replacement.

3.9.5.3 FASTENER GRADES

Use only grade 5 (metric 8.8) and grade 8 (metric 10.9) or better fasteners, nuts and locknuts with A325 hardened washers for functional loads. The *Grade markings chart* shows the fastener markings to be found on fasteners used on this ride. The manufacturer's identification symbols must be present on all functional load carrying fasteners.

This ride requires the use of cold-formed hex head fasteners with rolled threads. Hex bolts and hot formed hex head fasteners are not recommended because they may have machined threads and can have die seams along the shank.

WARNING

NEVER REPLACE Fasteners OR NUTS WITH PARTS OF A LESSER GRADE, OR DIFFERENT LENGTHS THAN THOSE BEING REPLACED.

3.9.5.4 REPLACEMENT OF FASTENERS AND LOCKNUTS

When permanently installed fasteners and locknuts are disassembled for repair or adjustment, they must be replaced if they have been in service over five (5) years, or corrosion, or other damage requires over-torquing for removal. If a torque wrench is not used to measure excessive removal torques, the fasteners and locknuts must be replaced after each removal.

Notes:

1. Use anti-seize lubricant on fastener shank when tightening from head end.
2. Use 10% less torque when anti-seize or other lubricant is used on threads.
3. Use same torque range for holes tapped in steel.

3.9.5.5 FASTENER QUALITY ACT COMPLIANCE

The use of replacement fasteners shall require full compliance with the Federal Fastener Quality Act (information can be obtained at www.nist.gov/fqa).

3.10 ELECTRICAL SYSTEM DATA

A complete description of the operation for electrical power, motor controls, lighting, safety controls and other systems that make up the electrical system of the equipment will be found in attachment #1 this Maintenance Manual. Each component used within the equipment has been assigned an individual identification number, symbol or code to facilitate its location and identify it on schematics. All electrical components are CE listed or have an equivalent listing to the U.L. listing. If non listed components or assemblies are used Moser Rides S.R.L. has defined the procedure for obtaining verification with the U.L. requirements. Figures 3.6-1 and 3.6-2 show views of the Main Electric Panel and the Lighting Panel. Figures 3.6-3 and 3.6-4 show views of the D.C. Motor brake and Tachometer.

3.10.1 LOCATION DIAGRAMS

A set of drawings or diagrams that locate the components of the electrical portion of the equipment is located in attachment #1 of this Maintenance Manual. If access to the component requires opening or removing other components, a procedure is provided for gaining safe access.

3.10.2 SCHEMATIC DIAGRAMS

A set of schematic diagrams for the equipment, suitable for identifying and trouble shooting the connections between components of the equipment is provided in Appendix #1 of this Maintenance Manual. The schematic diagrams extend down to the circuit board level only if the board contains field replaceable components.

3.10.3 WIRE LISTS

A complete set of wire lists for each assembly and interconnection junction for the equipment is provided in Appendix 1 of this Maintenance Manual. Wire lists include, as a minimum, the function of the circuit, the voltage and polarity, wire type, wire color code, starting terminal location, and ending terminal location.

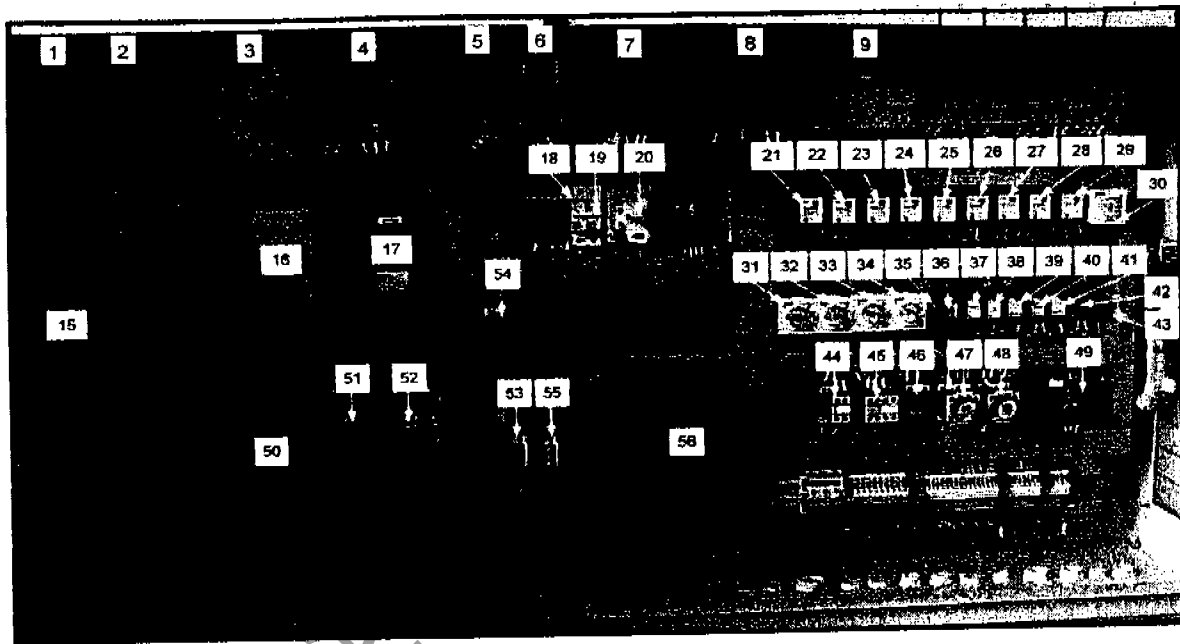


Figure 3.6-1 Main Electrical Panel

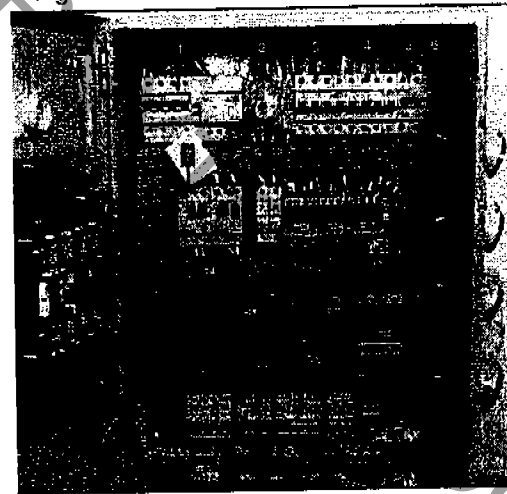


Figure 3.6-2. Light Electrical Panel

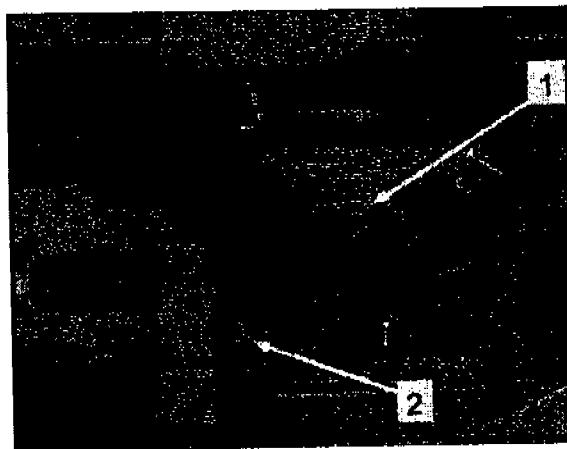


Figure 3.6-3. DC Motor (1) and Fan (2).

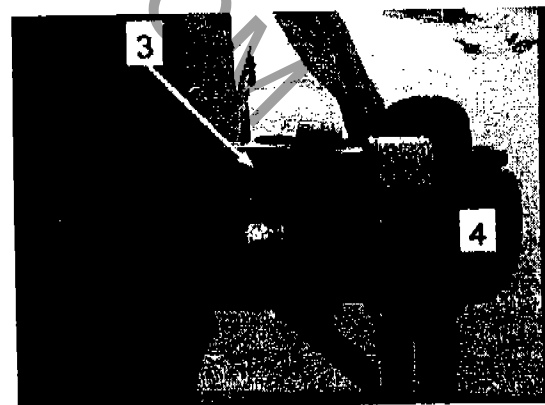


Figure 3.6-4 Electromagnetic brake for ridestationing (3) and Tacdhometer for DC motor speed control (4).

3.10.4 TROUBLESHOOTING GUIDE

A detailed, step-by-step procedure for troubleshooting the equipment is provide in Appendix #1 of this Maintenance Manual. The procedures include, but are not limited to, functional / logical flow diagrams, waveform diagrams, test signal requirements, test stimulation requirements and any special test equipment required for troubleshooting.

3.10.5 RECOMMENDED MAINTENANCE PROCEDURES

A step-by-step set of maintenance procedures linked to the procedures in the troubleshooting guide are provided in Appendix #1 of this Maintenance Manual..

3.10.6 COMPONENT MANUFACTURER DATA

Copies of cut-sheets on all replaceable, listed components used in the equipment are provided in Appendix #1 of this Maintenance Manual. Cut-sheets on any replaceable, unlisted components used in the equipment are also provided.

3.11 HYDRAULIC SYSTEM DATA

There is no hydraulic system on the Free Whale/Flying Ace.

3.12 PNEUMATIC SYSTEM DATA

The Free Whale/Flying Ace Pneumatic System serves five (5) functions:

1. It controls the open/close (manual) of the Restraint system. The valve blocks the Open when power is not applied.
2. The Lock at each restraint cylinder. Whjen power is applied and the #2 open cylinder is activated, the Restraints can be opened manually.
3. Safety Latch on the Restraint system. The safety latch has an internal spring that holds the latch on. Air pressure is applied to open the latch.
4. Open/Close of the entry/Exit gates.
5. Engagement cylinder for the Drive Wheel assembly.

Each of the five circuits has an individual pressure gauge and pressure regulator to set the operating pressure for the equipment. The Air Compressor has a master pressure regulator and gauge, filters, and a reservoir that must be drained daily. There is also an Emergency relief valve on the reservoir. There is an air hose that goes up one strut and down to the Gondola to operate elements #1, 2, and 3. Filters must be checked and maintained

regularly. Copies of cut-sheets on pneumatic components used in the equipment are provided in Appendix 3 of this Maintenance Manual.

3.13 MECHANICAL SYSTEM DATA

Data for the mechanical portions of the Free Whale/Flying Ace are provided in the mechanical drawings which are provided with the ride and become Appendix 2 of this Maintenance Manual. There are three (3) major mechanical assemblies on the Free Whale/Flying Ace. These assemblies include the double A-Frame, Drive System, and Gondola. All mechanical components meet the requirements of DIN 4112 and other related standard specifications.

3.13.1 LOCATION DIAGRAMS

A top assembly drawing allows the user to locate the components of the mechanical portion of the equipment.

3.13.2 ASSEMBLY DRAWINGS

Assembly drawing for important and/or repairable elements of the Free Whale/Flying Ace are provided. These drawings are suitable for identifying and trouble shooting the assemblies and components of the equipment.

3.13.3 SPECIAL DATA

Special data for each critical assembly and component that performs a critical function in the equipment is provided in the drawing package. The special data includes, as a minimum, the function of the critical assembly or component, the acceptable design loads, fastener data, identification code and special repair processes, if any.

3.13.4 TROUBLESHOOTING GUIDE

Information required for preventive maintenance and troubleshooting are provided in this Maintenance Manual. The Free Whale/Flying Ace is a sophisticated ride but does not require detailed testing or special test equipment or tools.

3.13.5 RECOMMENDED MAINTENANCE PROCEDURES

Maintenance procedures required to keep the Free Whale/Flying Ace operating are provided in other sections of this Maintenance Manual.

3.13.6 COMPONENT MANUFACTURER DATA

Drawings or cut sheets for all replaceable standard components used in the equipment are provided in the drawing package that is attached to this Maintenance Manual as Appendix 2.

3.13.7 PARTS LIST

The drawings provided have a parts list for the assembly of each major portion of the ride. The parts list indicates the manufacturer of the part or fabricator of the part and the associated part number or identification for the part.

3.14 DESCRIPTION OF ASSEMBLY / DISASSEMBLY-SPECIAL ASSEMBLIES

At this time there are no specific special procedures for the step-by-step assembly and disassembly process and techniques for assemblies requiring special handling or tools during normal and unscheduled maintenance.

3.15 RECOMMENDED RESTRICTIONS AND SPECIAL PROCEDURES

The Free Whale/Flying Ace is designed to provide a safe and fun ride for the Riders. Maintaining the designed level of safety for the ride is extremely important. The following items are designated as SAFETY CRITICAL:

The two (2) PILLOW BLOCKS on the SWING SHAFT of the CROSS HEAD assembly

No changes, modifications or substitutions are permitted without THE EXPRESSED WRITTEN PERMISSION OF Moser Rides S.R.L.

3.16 SUPPLEMENTAL NOTIFICATION

Moser Rides S.R.L. will provide supplemental notification bulletins to the Owner / Operator of the Free Whale/ Flying Ace whenever the equipment design is improved, modified or changed. The supplemental bulletins will provide procedures for inspection, NDT and functional testing of existing assemblies or components that are affected by the bulletin. The supplemental bulletin will have a date of issue, effective date of implementation and signature of the issuing agency. The testing and inspection procedures shall conform to the requirements of AS F846 and AS F1159. Moser Rides S.R.L. will, if the bulletin is issued as a result of a major or critical failure, provide structural, electrical or mechanical calculations and drawings to support the required bulletin implementation.

Moser Rides S.R.L. has an ongoing product improvement program to assure the highest operational availability and safety of the Free Whale/Flying Ace. Moser Rides S.R.L. will notify the Owner/Operator of the Free Whale/ Flying Ace of any changes in drawings or data or software by means of a SUPPLEMENTAL NOTIFICATION BULLETIN (SNB). In the event the SNB requires a modification or change to the Free Whale/Flying Ace, Moser Rides S.R.L. will provide procedures for implementing the SNB. Testing and Performance Testing of the Free Whale/Flying Ace following the issuing and implementation of a SNB will be included as part of the SNB document.

3.16.1 SOFTWARE BULLETINS/VERIFICATION

There is no PC or PLC on the Free Whale/Flying Ace. No software is required to operate the Free Whale/Flying Ace. The software in the motor controller is EPROM.

3.16.2 REPLACEMENT PARTS

The design and manufacture of the Free Whale/Flying Ace requires the careful assembly and test of all critical Sub-Systems and Assemblies. Because of the special or critical nature of the parts used in these Sub-Systems and Assemblies, they should be purchased from the Moser Rides S.R.L..

WARNING

Any attempt to use unauthorized or unapproved replacement parts in any Free Whale/Flying Ace Sub-System can result in serious damage to the Free Whale/Flying Ace. Any attempt to use unauthorized or unapproved replacement parts in any Free Whale/Flying Ace Sub-System or Assembly can result in serious INJURY to Guests or Operators of the Free Whale/Flying Ace.

3.17 MODIFICATION PROCEDURES

All modification procedures for the equipment are to be in compliance with the requirements of ASTM F1159.

3.17.1 MODIFICATION TESTING

Provide a description of the testing of the equipment following modification so that the tests are in compliance with ASTM F846.

3.17.2 REPLACEMENT PARTS

The design and manufacture of the Free Whale/Flying Ace requires the careful assembly and test of all critical Sub-Systems and Assemblies. Because of the special or critical nature of the parts used in these Sub-Systems and Assemblies MUST be purchased from the Manufacturer.

WARNING

Any attempt to use unauthorized or unapproved replacement parts in any Free Whale/Flying Ace Sub-System can result in serious damage to the Free Whale/Flying Ace. Any attempt to use unauthorized or unapproved replacement parts in any Free Whale/Flying Ace Sub-System or Assembly can result in serious INJURY to Riders or Operators of the Free Whale/Flying Ace.

3.17.2.1 PROCURED FROM SUPPLIER / CONTRACTOR

Moser Rides S.R.L. maintains a reasonable inventory of critical parts for the Free Whale/Flying Ace. Additional "factory authorized" parts may be purchased from a factory authorized local supplier as long as the factory has provided the Owner / Operator a letter certifying direct purchase of a direct replacement spare part that is not in inventory at the Moser Rides S.R.L. factory.

3.17.2.2 PROCURED FROM DRAWINGS / SPECIFICATIONS

In the event Moser Rides can not provide the required spare or replacement part they can authorize the Owner / Operator to purchase an equivalent part that meets the requirements, dimensions and performance as defined by Moser Rides S.R.L. drawings and specifications. Authorization for the Owner / Operator to purchase alternate parts from drawings and specifications must be provided in writing by Moser Rides S.R.L. The source selected to provide the part must meet the same criteria as applied to Moser Rides S.R.L. or their qualified sub-contractor.

3.17.2.3 PRODUCED FROM DRAWINGS / SPECIFICATIONS

In the event Moser Rides cannot provide the required spare or replacement part they can authorize the Owner / Operator to have the part built, fabricated or purchased to Moser Rides S.R.L. drawings and specifications. Authorization for the Owner / Operator to fabricate parts from drawings and specifications must be provided in writing by Moser Rides S.R.L. The source selected to fabricate the part must meet the same criteria as applied to Moser Rides S.R.L. or their qualified sub-contractor.

3.17.2.4 NON-STANDARD PARTS

Non-Standard parts shall not be permitted to be used on the Moser Rides S.R.L. Free Whale/Flying Ace. The use of any non-standard parts in the Free Whale/Flying Ace will immediately void any written or implied warranty. The Owner / Operator accepts all resulting liability from the use of non-standard parts in the Free Whale/Flying Ace.

3.17.2.5 COMPLIANCE WITH STANDARDS

Moser Rides S.R.L. has an established policy requiring that the acceptable alternate source or sources for maintenance parts shall be capable of complying with the minimum quality standards established by ASTM F1193 and/or the applicable European Directives. The replacement parts shall be produced in accordance with the provisions of ASTM F1159 and/or the European Directives. The replacement parts shall be inspected and tested in accordance with the applicable provisions of ASTM F846 and/or the applicable European Directives.

4.0 OWNER / OPERATOR RESPONSIBILITY

The Purchaser / EMP or their designated consultant shall transfer applicable sections from the Moser Rides S.R.L.'s Responsibility portion of the manual to fill out the sections within the Owner / Maintenance Technician Responsibility portion of the manual. Any sections within the Owner / Maintenance Technician portion of the manual that requires special action or attention shall be identified by the Contractor / Supplier. Where meaningful and applicable the Contractor / Supplier shall provide additional data, drawings and pictures to support this portion of the manual.

4.1 DESCRIPTION OF PREVENTIVE MAINTENANCE ASSIGNMENTS

4.1.1 DESCRIPTION OF INSPECTIONS

4.1.2 DESCRIPTION OF SAFETY INSTRUCTIONS

4.2 TRAINING

4.2.1 INSTRUCTION ON INSPECTION

4.2.2 INSTRUCTION ON PREVENTIVE MAINTENANCE

4.2.3 DEMONSTRATION OF PHYSICAL DUTIES

4.2.4 OBSERVATION OF PHYSICAL PERFORMANCE

4.3 DAILY PRE-OPENING INSPECTION

4.3.1 DAILY PRE-OPENING INSPECTION CHECK-LIST

4.3.2 DAILY PRE-OPENING INSPECTION RECORDS

4.3.3 STRUCTURAL INSPECTION

4.3.4 ELECTRICAL INSPECTION

4.3.5 HYDRAULIC INSPECTION

4.1.2 DESCRIPTION OF SAFETY INSTRUCTIONS

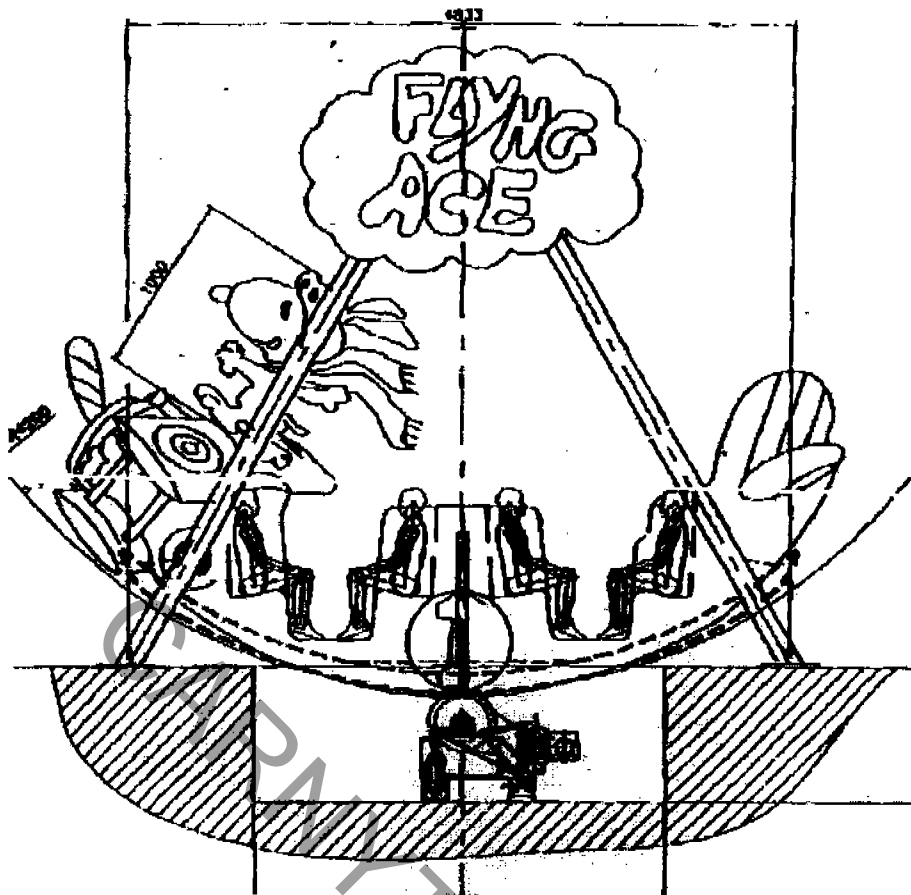
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 - 4.3.5 HYDRAULIC INSPECTION
 - 4.3.6 PNEUMATIC INSPECTION
 - 4.3.7 RIGGING INSPECTION
 - 4.3.8 PASSENGER CARRYING DEVICES INSPECTION
 - 4.3.9 ENTRANCE / EXIT / STAIRWAY / RAMP INSPECTION
 - 4.3.10 FUNCTIONAL TEST ALL COMMUNICATIONS EQUIPMENT
 - 4.3.11 TEST AUTOMATIC AND MANUAL SAFETY DEVICES
 - 4.3.12 TEST BRAKES / STOPS / OVERTRAVEL
 - 4.3.13 INSPECT RAILINGS AND GATES
 - 4.3.14 RIDE OPERATIONAL TEST
- 4.4 UNSCHEDULED CESSATION OF OPERATION
 - 4.4.1 MALFUNCTION OR ADJUSTMENT
 - 4.4.2 MODIFICATION
- 4.5 ENVIRONMENTAL CONDITIONS



FREE WHALE/ FLYING ACE

MAINTENANCE MANUAL

PARK MODEL

Designed and Manufactured by

Moser Rides S.R.L.

APPENDIX #1 ELECTRICAL

- 4.2.4 OBSERVATION OF PHYSICAL PERFORMANCE
- 4.3 DAILY PRE-OPENING INSPECTION
 - 4.3.1 DAILY PRE-OPENING INSPECTION CHECK-LIST
 - 4.3.2 DAILY PRE-OPENING INSPECTION RECORDS
 - 4.3.3 STRUCTURAL INSPECTION
 - 4.3.4 ELECTRICAL INSPECTION
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