

Sharing on Maintenance Outcomes Requirements for Amusement Rides & Common Inspections Findings

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16 Slides



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Part 1

Maintenance Outcomes Inspections

Objectives of Maintenance Outcomes Checklists

- Ensure safety of amusement rides through proper maintenance requirements set out in the MO checklists
- Reduce maintenance-related observations picked up during inspections
- Streamline inspections on assessment of safety level of amusement rides

Sections Covered in Maintenance Outcomes Checklists

Structural

- 1 Columns and Beams
- 2 Foundations & Footings
- 3 **Fasteners and Welds**
- 4 Fencing and Gates
- 5 Tracks and Supports
- 6 Ground/Floor Condition
- 7 Support Yoke
- 8 Stability
- 9 Chassis Frame
- 10 Dampeners

Mechanical Parts:

- 1 **Wire ropes and Cables**
- 2 Friction Brakes/Fin
- 3 Chains
- 4 Water pumps (flow rate)
- 5 Hydraulic and Pneumatic
- 6 Actuation Mechanism
- 7 Wheels and Bogeys
- 8 Drive motor and Gearbox
- 9 Winch and Pulley

Electrical, Electronic & Controls:

- 1 Operator Control
- 2 IP rating
- 3 **Insulation and Grounding**
- 4 Integrity of Electrical Panel
- 5 Condition of Cable and Connections
- 6 Sensors and Safety Switches
- 7 Batteries and Wirings
- 8 MCB and RCB

Safety Equipment

- 1 Full Body Harness
- 2 Lanyards and Ankle Straps
- 3 Helmets and Life Vests
- 4 Surf Boards and Tubes
- 5 **Cabins and Seats**

Sections Covered in Maintenance Outcomes Checklists

Patron Restraint

- 1 **Over-the-shoulder Restraint**
- 2 Lap Bar
- 3 Seat Belt
- 4 Seat Buckle

Pax Containment and Safety Envelope

- 1 Safety Clearance
- 2 **Ride Surface**
- 3 Fencing and Railing

System checks

- 1 Risk Assessment
- 2 **Maintenance Records**
- 3 Maintenance Manuals
- 4 Manufacturer Requirements
- 5 Maintenance Log Book

Function Tests

- 1 Water Flow Rate
- 2 Emergency Stoppage
- 3 Fail Safe Design
- 4 Redundancy System
- 5 **Safe Stoppage and Speed Limit (No Overspeed)**
- 6 Zone Dispatch And Safety
- 7 Limit Switches

Miscellaneous

- 1 CCTV Coverage
- 2 Proper Signage

AR MO Checklists

AR Maintenance Outcomes - Cable Ski

Ride Name: _____ Date: _____

Amusement Ride No.: _____ Location: _____

No.	Points of Inspection	S=Satisfactory, U=Unsatisfactor	Remarks, if any
Foundation and Structural Elements			
	Check the foundation for any deformation or cracks, and its surrounding for any loose soil condition, Checks to include all Pylons Base foot plates integrity, tie backs columns and anchoring cable to check for integrity		
	Check the Structural elements for any Loose bolts, rust build up, check for spalling concrete at tie back columns.		
	Check that the counterweight block is at the acceptable level and that it is not too low		
Wire Ropes, Chains and their Accessories			
	Check on the Condition of wire ropes and accessories for signs of corrosion, elongation or fraying.		For System C: Length of safety cable adjusted to ensure mounted working platform to be horizontal for correct tensioning of running cables,
	Check wire rope terminations for any fraying in wire ropes, thinning of running cable (8mm)		
	Check that the traction/driving sheaves have not worn out		
Pressure Vessels and Accessories			
	Check that the pressure vessels are in an acceptable condition with no significant wear and tear and ensure validity of certificate of air receiver		System C: Check validity of certificate of air receiver

- Encouraged to use checklist for your baseline maintenance requirements as

- BCA also uses these checklists for our regular audits during inspection

To fill up “S” for satisfactory or “U” for unsatisfactory with the rectifications in the remarks column

Some of the maintenance requirements extracted for your reference



Part 2

Observations from BCA's audit inspections

Annual Operating Permit

Routine Maintenance

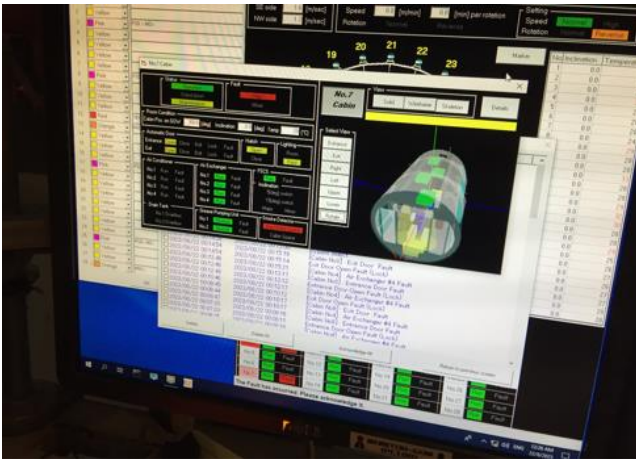
Routine Operations

Mystery Shopper

Annual Operating Permit (OP) Renewal Inspection



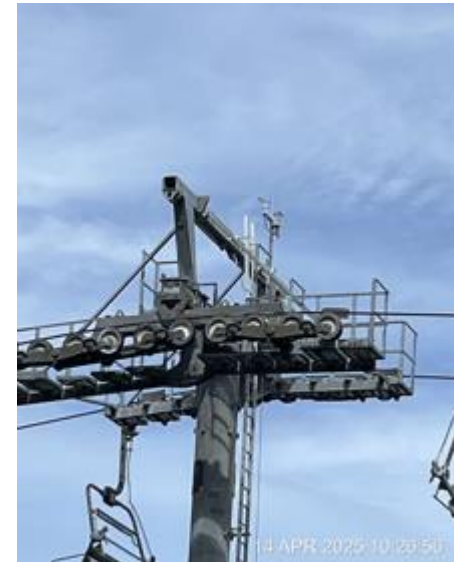
- Usually scheduled **2-3 months** before OP expiry
- For major rides, SPE and Conformity Assessor must be present
- For non-major rides, SPE must be present
- In-depth inspections including all functional tests and structural inspections



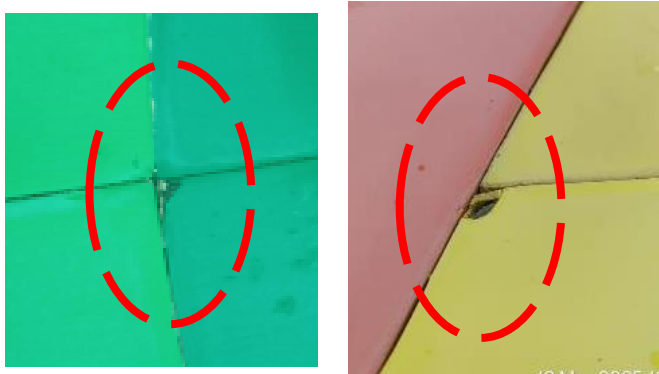
Routine Maintenance Inspection



- Rides with high technical risks are inspected more frequently
- Concentrate more on maintenance components and records keeping (usage/cycles)



Common Observations



Worn flume surfaces



Cracks found on welded area

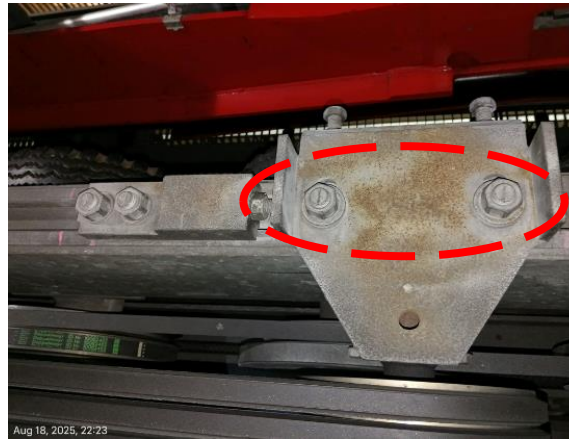


Harness equipment damaged

Common Observations



Corrosion at structural components



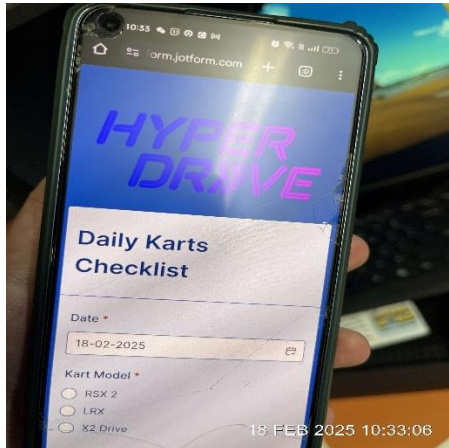
Torque Strip not applied after repair



Damaged seating or surfaces of RV

Records not digitalised

Routine Operations Inspection



- Rides with high operational risks are inspected more frequently
- Focus on patron safety point of view (from queue line to dispatch to exit) and
- Focus on operator staff competencies on the ground (briefing, operation procedures, crowd control and emergency response)
 - Pre/post operations checks
 - Training records
 - Random interview with operator staff
 - SOP in case of incidents
 - Facilities for First aid/sick bay

Mystery Shopper Inspection

- **Random unannounced** inspection by BCA officers
- Mystery Shoppers are **trained** on what to look out for
- Provides 100% perspectives from a **patron's Point-of-View**



Common Observations

Operators should ensure patrons actively watch and comprehend safety videos/briefings

Queue line wet or unsafe for patrons in waiting

Operator staff unclear of rescue means

Warning signs removed or blocked or faded

Verification of registration not completed (such as weight, driving license for higher speed go-kart, health conditions...)

Used helmets or equipment not cleaned/sanitized after use

Call to Action

Ensure rides are maintained and operated properly

Use the Maintenance Outcome Checklists as baseline checks





Thank You



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