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CONFERENCE: NOV. 17–21, 2014 • TRADE SHOW: NOV. 18–21, 2014

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Pre-opening Inspections: Turning Requirement into Benefit

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Goals

- Identify requirements of pre-opening inspections.
- Share facts about the science behind memory retention.
- Provide guidance on achieving beneficial results with inspections.

Agenda

1. Inspection Requirements
2. The Science Behind Inspections
3. Building in the Benefit

1. Inspection Requirements

ASTM F770-14

4 | Owner/Operator's Responsibility

4.1.4 **The ride or device operator of each amusement ride or device shall conduct a daily pre-opening inspection of each ride or device prior to carrying passengers. This inspection shall include but not be limited to the following:**

- ***4.1.4.1*** **Visual check of all passenger-carrying devices, including restraint devices and latches.**
- ***4.1.4.2*** **Visual inspection of entrances, exits, stairways, and ramps.**
- ***4.1.4.3*** **Test of all communications equipment necessary for the operation of the ride or device.**
- ***4.1.4.4*** **Prior to carrying passengers, the ride or device shall be operated for a minimum of one complete operating cycle.**

Manufacturer Requirements

Typically include the requirement to check items such as the following:

- Patron Carrying Devices, Including Restraint Devices
- Entrance, Exits, Stairways and Ramps
- Communication Equipment
- Operation for a Minimum of One Complete Cycle
- Automatic and Manual Safety Devices
- Fencing, Guarding and Barricades
- Structure

WHY REQUIREMENTS ARE IMPORTANT

By the numbers…

In the years between 2004 and 2013 the following occurred partially due to inspections not being in place or properly followed:

- 23 families endured tragic or traumatizing experiences
- 15 people were seriously or fatally injured
- 6 rides were temporarily or permanently closed
- 2 park employees were charged with negligent homicide
- 1 park was closed for 10 days due to investigation

South Carolina – October 2006

A boy was ejected from a rollercoaster. On the first turn the restraint popped open and the boy was thrown from the vehicle. The restraint latch would not stay closed.

- ASTM F770-14 Restraint Check 4.1.4 & 4.1.4.1
- Patron Carrying Devices, Including Restraint Devices
- ASTM F770-14 Minimum One Complete Cycle 4.1.4.4
- Automatic and Manual Safety Devices

Rio De Janeiro – June 2010

A woman fell 30 feet from a rollercoaster. The safety bar was properly closed, however, the locking mechanism was found to not be operating properly which contributed to the woman being ejected from the ride.

- ASTM F770-14 Restraint Check 4.1.4 & 4.1.4.1
- Patron Carrying Devices, Including Restraint Devices
- ASTM F770-14 Minimum One Complete Cycle 4.1.4.4
- Automatic and Manual Safety Devices

Florida – March 2013

A malfunction on a looping-style ride caused the 20-passenger vehicle to stop suddenly at the bottom of the loop. Passengers were left with cuts and bruises. Investigation revealed axles with missing screws.

- ASTM F770-14 Visual Inspection 6.3 & 6.3.7
- Structure

Alberta – July 2010

While cycling, a spinning ride broke apart at the vehicle sweep assembly and injured 10 people. One of the vehicle groupings broke off it's arm, fell off the ride platform, and crashed into a barrier. The structure showed visual signs of fatigue cracks and faulty welding.

- ASTM F770-14 Visual Inspection 6.3 & 6.3.7
- ASTM F770-14 Minimum One Complete Cycle 4.1.4.4
- Structure

Iowa – July 2006

A girl was hospitalized after being hit by a loose board that had been placed near the ride path.

- ASTM F770-14 Visual Inspection 6.3 & 6.3.7
- Structure

England – November 2004

A 16’ long section of ride track had been removed for routine maintenance and not replaced. The operator of the ride engaged the emergency stop brakes just in time, leaving the front car hanging off the edge of the track. The 12 passengers remained unharmed.

- ASTM F770-14 Visual Inspection 6.3 & 6.3.7
- ASTM F770-14 Minimum One Complete Cycle 4.1.4.4
- Structure

VERBAL VS. WRITTEN INSTRUCTION

HOW INDIVIDUALS INTERPRET THINGS DIFFERENTLY

Table Top Exercise

- Verbal instruction will be given to the entire room.
- Some attendees have written directions to use if they choose.

Discussion of Results

- Let's review the results.
- Do the drawings look similar between attendees?
- What is the subject of the drawing?

2. The Science Behind Inspections

Written Inspection Facts

- Improve organization
- Save time
- Allow for the delegation tasks
- Assist the prioritizing tasks
- Communicate material more concisely

Written inspections make sure certain tasks get done, but just as importantly, define tasks that don't need to be done.

"The use of checklists in aviation, aerospace, and the military serves to decrease errors of omission, improper implementation of procedures and protocols, and to decrease human errors under stressful conditions."

- Journal for Quality in Health Care

Memory Fatigue

Checklists reduce prospective memory failures…

- Prospective memory is the ability to remember to carry out actions in the near future that are planned after experiencing a delay or interruption.

- Memory is also likely to be more error-prone during a stressful situation.

Factors Impacting Memory

Your ability to remember is directly related to diet and habits.

- **Sleep – When you're sleep deprived your brain cannot operate at its full potential. Creativity, problem-solving abilities, and critical thinking skills are compromised.**
- **Stress – One of the brain's worst enemies, chronic stress is the response to emotional pressure suffered for a prolonged period. Chronic stress destroys brain cells and damages the region of the brain involved in the formation of new memories and retrieval of old ones.**

HOW IS YOUR MEMORY TODAY?

12 characters will flash on the screen for one second each.

Try to remember as many as possible.

3

F

H

6

5

E

G

1

D

2

4

STOP

- Can you remember all the items?
- Can you remember them in sequence?
- Try to write down the characters in sequence.

Discussion of Results

- **Can you think of a better way to sort the characters to make them more memorable?**
- **Did you recognize the consecutive set of numbers and letters?**
  - 3FH65EG1D24I
  - DEFGHI 123456
- **Grouping of similar items makes it much easier to recall, and to follow.**

3. Building in the Benefit

Making Inspections Work for You

- **Do you have a safety program in effect at your sites?**
  - Increase effectiveness by including process steps in inspections.
- **Are there initiatives at your site which need focus?**
  - Safety is just one aspect which can be included in inspections.
- **Priorities change, so can beneficial items on inspections.**

Building Successful Inspections

- **Inspections should be made within the organization that intends to use it.**
  - Proximity to the checklist development process is very important.
- **A crucial component of inspection design is to allocate tasks to individuals.**
  - This prevents diffusion of responsibility and avoids assumptions.
- **Use plain speak, familiar and accessible language, along with high contrast readable fonts to make inspections approachable by all users.**

Pre-Opening Inspection

Layering it all Together

ASTM Requirements

Verify the lights in the queue are turned on.

Verify the gate latch is in place and operating properly.

Verify the ride platform and exit ramps are free of standing water and clear of debris.

Physically verify the three exit gates are operating properly.

Layering it all Together

Pre-Opening Inspection

Verify the lights in the queue are turned on.

Verify the gate latch is in place and operating properly.

Verify the ride platform and exit ramps are free of standing water and clear of debris.

Physically verify the three exit gates are operating properly.

Manufacturer Requirements

Verify the pavement around the perimeter of the attraction is in good condition.

Verify there are no vehicles with red clips.

Layering it all Together

Pre-Opening Inspection

Verify the pavement around the perimeter of the attraction is in good condition.

Verify the lights in the queue are turned on.

Verify the gate latch is in place and operating properly.

Verify the ride platform and exit ramps are free of standing water and clear of debris.

Verify there are no vehicles with red clips.

Physically verify the three exit gates are operating properly.

Added Benefit

Verify with a manager Operations has control of the attraction and may begin Opening Procedures.

Wipe down the tops, sides, and lips of the waste receptacles when necessary.

Verify the fans in the queue are turned on, as necessary.

Layering it all Together

Pre-Opening Inspection

Verify with a manager Operations has control of the attraction and may begin Opening Procedures.

Verify the pavement around the perimeter of the attraction is in good condition.

Wipe down the tops, sides, and lips of the waste receptacles when necessary.

Verify the lights in the queue are turned on.

Verify the fans in the queue are turned on, as necessary.

Verify the gate latch is in place and operating properly.

Verify the ride platform and exit ramps are free of standing water and clear of debris.

Verify there are no vehicles with red clips.

Physically verify the three exit gates are operating properly.

Grouping

Vehicle Checks

Start-Up Procedures

Layering it all Together

Pre-Opening Inspection

Verify with a manager Operations has control of the attraction and may begin Opening Procedures.

Verify the pavement around the perimeter of the attraction is in good condition.

Wipe down the tops, sides, and lips of the waste receptacles when necessary.

Verify the lights in the queue are turned on.

Verify the fans in the queue are turned on, as necessary.

Verify the gate latch is in place and operating properly.

Verify the ride platform and exit ramps are free of standing water and clear of debris.

Vehicle Checks

Verify there are no vehicles with red clips.

Start-Up Procedures

Physically verify the three exit gates are operating properly.

Sustaining the Benefit

- **Every inspection should be tested with real users in realistic scenarios.**
  - Testing is as much a part of making/updating a good inspections as any principle of design.
- **Revisions are important to maintain a dynamic and up to date inspection**
  - Revisions provide a vehicle to build a culture where workers feel their feedback is valuable.
- **Justify the journey, mark the installation/modification of an inspection so effectiveness can be evaluated.**

Questions?

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