Amendments to Amusement Rides Safety Regulations 2020

Ride Manager's Forum Webinar
28th July 2020
Presented by SE/Rayner Tan
Electrical and Mechanical Engineering Group

Building and Construction Authority

Gazette of ARSR Amendments and Operationalization Dates

Transition period of 6 months after the gazette of the changes for operationalisation of the amendments*

Grace Period

6 months | **6 months**

15 June 2020
Gazette of ARSR Amendments

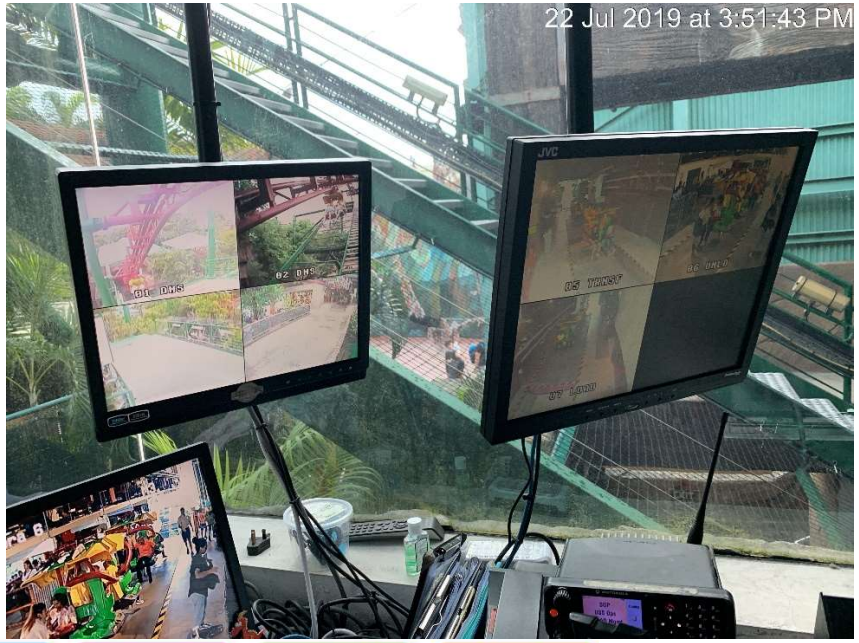
1 Jan 2021
Operationalisation of Amendments

15 June 2021
Operationalisation of Amendments to 2 new requirements for Go-Karts

*With exception to requirements for installing restraint device and roll over protection device for go-karts on 15th June 2021

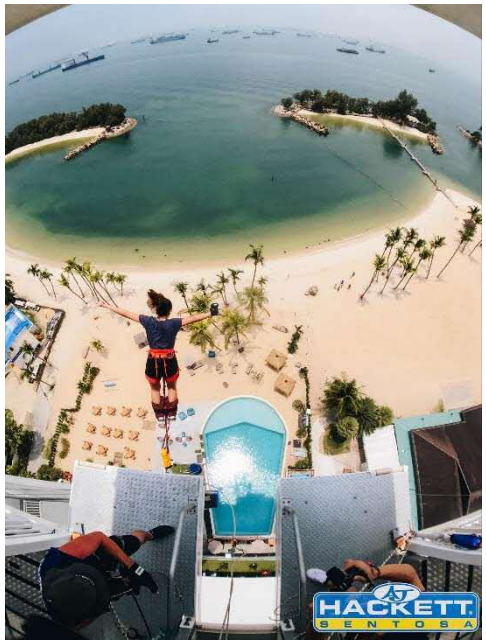
Amendment Items

- **Amendments that Affect All Rides**
  - Substituting to EN codes
  - OP renewal for period < 12 months due to insurance and COC
  - CCTV requirements



Amendment Items

- **Provisions that Affect Specific Existing Rides**
  - Definition of air-inflated enclosure
  - Go-karts
  - Bungee device
  - Bumper Cars
  - Inflatable
  - Second Schedule changes
  - Third Schedule changes
  - Fourth Schedule changes



Amendment Items

- **Regulating New Devices**
  - Free fall jump device
  - Funicular
  - Mechanical simulator
  - Play net
  - Roller glider

Provisions that Affect All Rides

Changing to EN codes:

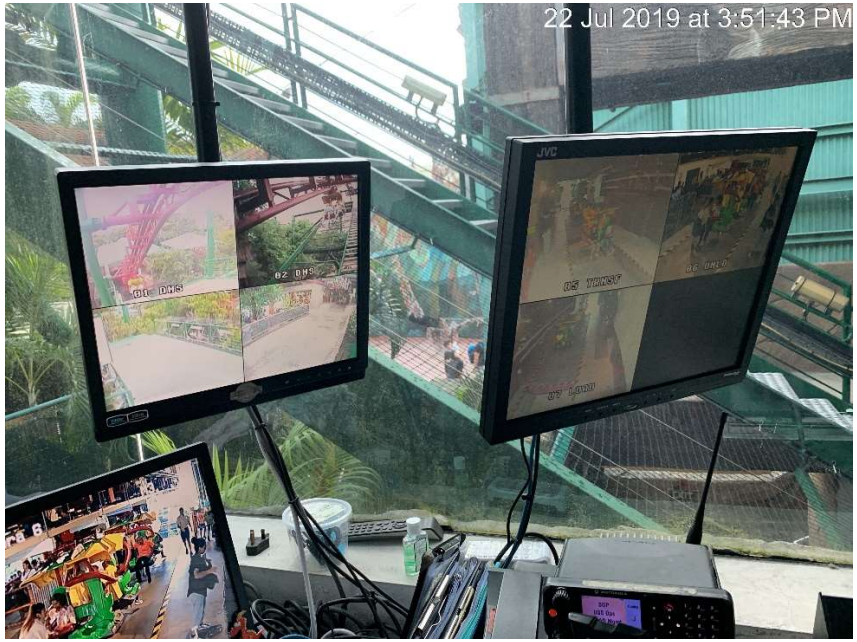
- All British Standard (BS EN) codes in the Regs substituted with European Committee for Standardization (EN) codes

Renewal of OP with a validity period < 12 months due to expiry of insurance or COC:

- Expiry of OP granted align to expiry date of insurance or COC, whichever earlier
- No gap of time between expiration and renewal of OP
- Renewed OP period up to 12 months from start of existing OP with QP cert
- QP and CA not required for such cases
- No application fee required as well

Electronic Visual Monitoring System requirements:

- Ensure operations recorded by CCTV
- Recordings to be retained for at least 14 days



For Specific Types of Existing Rides

Definition for air-inflated enclosure:

- Clarify that it includes those enclosures which contain openings, so long as the patron(s) are wholly enclosed within it so that no part of the patron(s) is/are outside of the air-inflated enclosure when it is in use

Regulated

Not Regulated

For Specific Types of Existing Rides

"Duties of go-karts operators"

Proposed amendments:

a) restraint device installed for each patron (*by 15 June 2021*);

b) rollover protection device installed in every go-kart (*by 15 June 2021*);

c) full-face helmet* to be worn by every patron for driving of go-karts

d) loose clothing and accessory stored securely for driving of go-karts

e) patron's hair (if > shoulder length) to be covered with a hair net for driving of go-karts

f) only vehicles specified in the OP shall be operated as part of the amusement ride

**Full-face helmet means a protective helmet that –*

(a) conforms to the requirements of the Singapore Standard Specification S.S.9.2014 – Protective Helmets for Motor Cyclists made by the Enterprise Singapore Board [established by section of the Enterprise Singapore Board Act 2018 (Act 10 of 2018)]; and

(b) bears the PSB Certification Mark, or PSB Batch Inspected label, by TUV SUD PSB Pte. Ltd.

For Specific Types of Existing Rides

"Duties of bungee devices operators"

Proposed amendments:

a) tandem jumping is allowed, but each patron has to be attached to separate bungee cords;

b) specimen of each type of bungee cords to be subjected to the same testing and certification requirements under the current regulations

"Duties of bumper cars operators"

Proposed amendments:

a) only vehicles specified in the OP shall be operated as part of the amusement ride;

For Specific Types of Existing Rides

"Inflatable in Second Schedule [Land]"

An inflatable, **or a group of inflatables** used together will be regulated as an amusement ride

Proposed changes for use on ***land***:

a) With enclosed space that is fully or partially roofed over or covered,

1) with base area ≥ 30m^2; or

2) the distance between the most remote point and the nearest exit ≥ 15m;

b) Maximum vertical displacement ≥ 5m **regardless of enclosure coverage**;

c) Projected base area ≥ 150 m^2, whether or not the inflatable has any enclosed space.

Current Req

For Specific Types of Existing Rides

"Inflatable in Second Schedule [Water]"

Proposed changes for use in ***water*** **(whether floating, partially submerged within or fully submerged in water):**

a) Maximum vertical displacement ≥ 5m **regardless of enclosure coverage**;

b) Projected base area **≥ 15 m^2**, whether or not the inflatable has any enclosed space; or

c) The largest linear dimension of the projected base of the inflatable **≥ 7 m.**

Regulation 19F

New duties of operators of inflatables (if operated on water) include:

- Life guards deployment
- Availability of rescue equipment

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For Specific Types of Existing Rides

<u>Changes to Third Schedule:</u>

- Mechanical simulator, go-karts, bumper cars and power-driven roller gliders of total motive power rating ≤ 1.1kW are not excluded from the regime

<u>Changes to Fourth Schedule:</u>

- Added major rides requirements for flume, river rafting, roller coaster and train rides when the maximum vertical displacement of a patron taking through the course of the ride is 10 meters or greater

Regulating New Devices

Free Fall Jump Device

"**free fall jump device**" means a device consisting of -

(a) a catch device that is designed to break the fall of a patron; and

(b) a structure that allows one or more patrons to jump off or be released from the structure and free-fall onto the catch device

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Regulating New Devices

Free Fall Jump Device

Second Schedule (Inclusion Criteria):

Maximum vertical displacement of a patron above the catch device is at least 5m

Fourth Schedule (Major Ride Criteria):

Maximum vertical displacement of a patron above the catch device is at least 10m

Code of Compliances:

ASTM Committee F24 Standards

Duties of Operators:

i. providing appropriate landing area, position and cushioning of catch device; and

ii. providing adequate supervision for the operation with only one patron jumping off at any one time

iii. ensuring only a static platform built and design for the ride is used

iv. ensure maximum height from jump point to the catch device ≤ 50m

Regulating New Devices

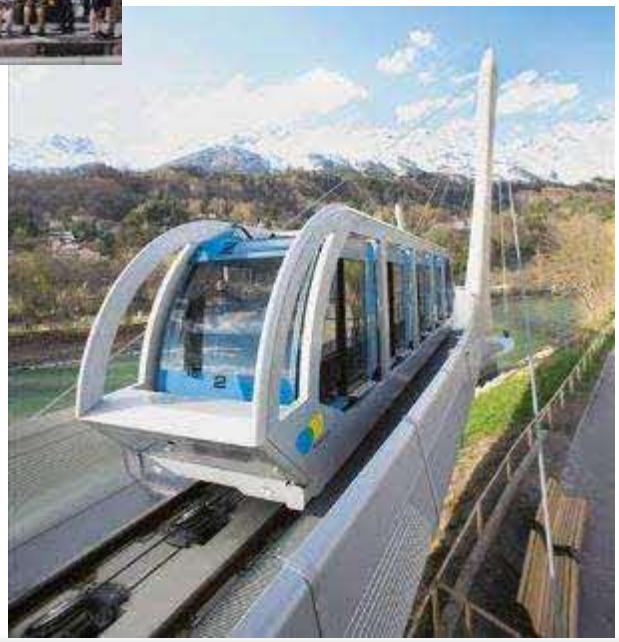
"**funicular**" *means a device for the carriage of patrons in or on a carrier –*

(a) that is supported and guided by a level or inclined guideway; and

(b) that is propelled by means by a haul rope or other flexible element that is driven by a power unit that remains at a single location;

and does not include a lift that is used or designed for use for raising or lowering, or both raising and lowering, people or goods, or both people and goods, in a substantially vertical direction.

Funicular



Regulating New Devices

Funicular

Second Schedule:

- Prescribed as an amusement ride

Fourth Schedule:

- Prescribed as a Major Ride

Code of Compliances:

i. ANSI B77.2 American National Standards

ii. CZA Z9B Canadian Standards

iii. EN 12929 (Parts I and II)

Duties of Operators:

- Similar to those of an aerial ropeway operator, including visual inspection and non-destructive testing inspection performed on every rope-fixing of the funicular

Regulating New Devices

"**mechanical simulator**" means a device -

(a) that consists of a unit in the shape of an animal, saddle, seat, surfboard or other platform that is mounted on a static base or support;

(b) that uses mechanical movements of the unit to simulate a rodeo, surfing or any other activity that requires a patron to maintain the patron's balance; and

(c) that is designed to allow a patron to fall off the unit during the patron's use of the ride

Mechanical Simulator

Code of Compliance:

i. ASTM Committee F24 Standards

ii. EN 13814

Regulating New Devices

Play Net

"**play net**" means a device consisting of one or more nets, that is –

(a) made of material or combination of materials including, but not limited to, ropes, wires, webbing, fabric or chains that form a flexible interlaced structure; and

(b) that are intended for one or more patrons to bounce on, walk on, crawl on, roll on, lie on or play on

Second Schedule (Inclusion Criteria):

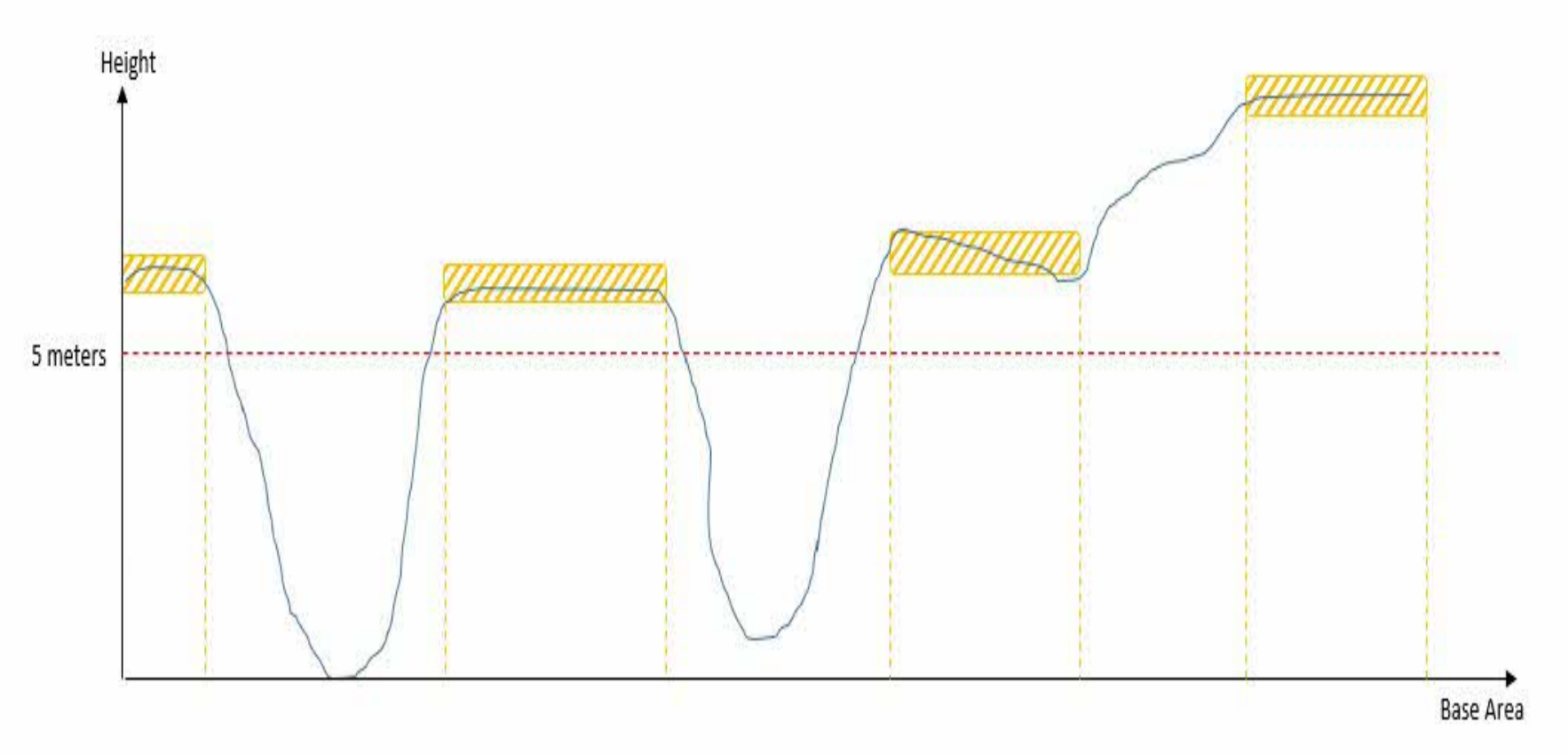
Where at least 150 square metres of its total area is installed —

(i) horizontally, or substantially horizontally, such that a patron may recline without holding on to the play net; and;

(ii) at least 5 metres above the ground or water surface.

Illustration

Play net Inclusion Criteria



- Area of net that allows a patron to recline in a supine position and also above 5 meters

Regulating New Devices

Duties of operators:

i. where the vertical displacement of a patron on the play net above the ground is equal to or exceeds 1 metre, providing edge protection against fall from height; and

ii. providing control measure for safe ingress and egress of patrons

Play Net

Code of Compliance:

i. ASTM F1487 – Standard consumer safety performance specification for playground equipment for public use

ii. EN1176 – Playground equipment and surfacing

iii. ASTM F24 Standards

iv. EN13814

Regulating New Devices

Roller Glider

"**roller glider**" means a device that includes a gliding mechanism (whether power-driven or not) —

(i) that moves on or is suspended from an elevated track; and;

(ii) that allows a patron holding on to or attached to the gliding mechanism to move along the track,

but excludes a roller coaster.

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Regulating New Devices

Roller Glider

Second Schedule (Inclusion Criteria):

For non power-driven roller glider where maximum vertical displacement of patron is at least 5m; or vertical displacement of the patron may be at least 10m above access level or if there are no access level, at any point along the track

Fourth Schedule (Major Ride Criteria):

For power-driven roller glider where the maximum vertical displacement of a patron is at least 5m, or vertical displacement of the patron may be at least 10m above access level or if there are no access level, at any point along the track

Duties of Operators:

i. providing redundancy for harness suspension points;

ii. providing adequate controls if >1 patron riding on the roller glider track

iii. having both a braking and an additional braking system for redundancy

Code of Compliances:

i. ASTM Committee F24 Standards;

ii. EN 13814

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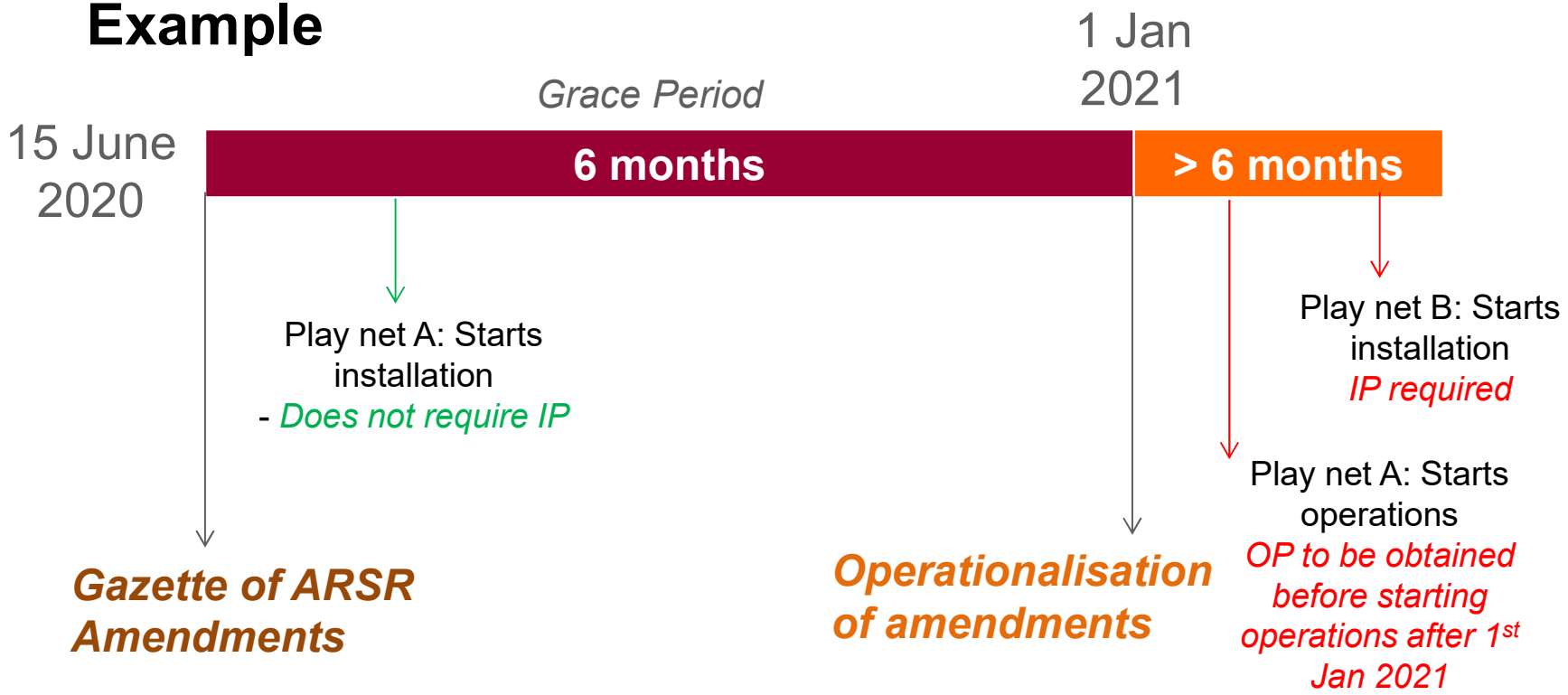
Example



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Annual Inspection of Amusement Rides in a COVID-19 Safe Manner

Presented by:
Er. S. Yogeeswaran
CASY Engineering Consultancy Pte Ltd
28 July 2020

Introduction

- CASY Consultancy Services was setup in 2004 and CASY Engineering Consultancy was incorporated in 2017
- Core services:
  - Engineering consultancy
  - Design calculations & review
  - Engineering process review
  - Project management
  - Fire safety consultancy
  - Inspection and submission to authorities

Introduction

- SPE in Amusement Rides since 2011
- NAARSO Level 3 Inspector
- ASTM F24 Committee
- IAAPA member
- ISO/TC 254 member
- Involved in various types of amusement rides

Various Types of Amusement Rides

- Aerial ropeway
- Bumper cars
- Carousel
- Drop tower
- Ferris wheel
- Flume ride
- Go-karts
- Gyro tower
- Indoor sky diving device
- Inflatable
- Jump device
- Luge
- Motion-based simulator
- Play nets
- Reverse bungee device
- Roller coaster
- Roundabout
- Swinging ride
- Trampoline bungee
- Water slides
- Ziplines

Type of Permits

- Installation Permit
- Operating Permit
- Modification Permit

Conformity Assessor (CA)

- Major Rides
- Approved by BCA
- SPE to consider the advice and opinion of a CA during design review, supervision of installation or inspection of a ride
- CA will complement the SPE with expertise in critical aspects of ride safety

Conformity Assessor (CA)

- Westlakes Engineering Ltd (UK)
- TUV SUD Industrie Service GmbH (Germany)
- Leisure Technical Consultants Limited - LTC (UK)

Role of CA

- Inspection and testing on critical components of a ride to determine that it has not deteriorated to an extent liable to cause danger
- During normal inspection:
  - Pre-inspection discussion with operator
  - Visual inspection of ride components
  - Functional test of ride functions

Criteria of CA

- At least 5 years of experience in inspection of major amusement rides;
- At least 5 years of experience in design review of major amusement rides; and
- With relevant degree (in the field of mechanical, electrical and civil engineering).

Remote Inspection by CA

- Before inspection, CA & SPE to prepare and agree on the inspection checklist to be used during remote inspection
- Functional test via video live stream to CA
- Visual inspection via HD video recording and photos
- Challenges faced by operators, CA and SPE

Remote Inspection
- Functional Test -

- Live streamed via Microsoft Teams with CA
- Before every functional test, we will let CA know what we are going to perform according to the inspection checklist
- After showing CA the functional test, CA will provide their comments. If satisfactory, we will continue with the next functional test.

Remote Inspection
- Visual Inspection -

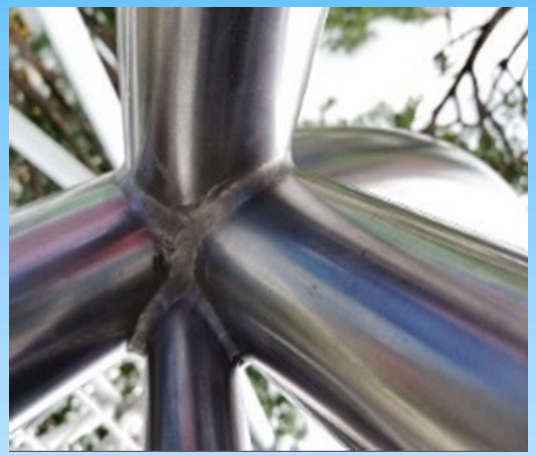
- Visual inspection via HD video recording
- Videos provided to CA to assess the condition of the various critical components of the ride
- Areas of concerned / deterioration will be documented in findings and shared with CA for their assessment

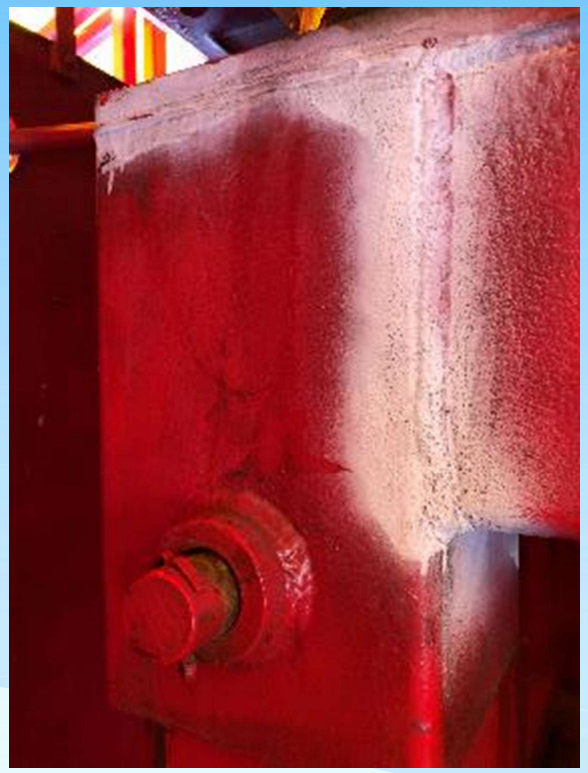
Remote Inspection
- Equipment -

Hardware	
Live Feed	HD Video recording
• Tablet • Mobile phone • Laptop	• GoPro • Camera with HD video capability • HD Video camera
Software	
• Microsoft Teams, Google Meet, Zoom etc.	

Inspector Perspectives

CRITICAL WELDS & JOINTS





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Remote Inspection
- Advantages -

- Easier arrangement of inspection schedule
- Able to accommodate last minute changes
- Greater efficiency with more manpower allocated
- Live feed can be feed at multiple location if required
- HD recording provided a physical record of ride condition at that time of inspection

Learning Point

- Require additional equipment & communication tool for remote inspection
- Require stable internet connection for live feed
- Need to manage the time onsite during inspection, time taken for inspection, record and feed will take a longer duration
- Ensure videos or photos quality are clear enough for CA to evaluate in lieu of close visual inspection
- Communication is essential
- Must be familiar with the rides as CA is dependent on SPE

Thank You

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Upcoming Plans for Amusement Rides Regime

1. Risk-based inspection schedule
2. Ride Manager application process

3. Plans for maintenance outcome-based enforcement
4. Amusement Rides Technical Seminar

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