

# RM FORUM 2024

## BCA – Recap of Amusement Rides Safety Regulatory Requirements

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# Agenda

- Clarification of an amusement ride under the ARSA and ARSR
  - Definition of an amusement ride
  - Inclusion and Exclusion list
  - Clarification on inclusion of specific Rides
  - General Parameters
- Reminder on the regulatory requirements for amusement rides
  - Application Process
  - Engineering codes and standards
  - Stakeholders and duties
  - Reporting adverse incidents
  - Examples of unauthorised rides
- Conclusion



# Clarifying of an Amusement Ride under the Amusement Rides Safety Act and Regulations



# Definition of Amusement Ride

## “amusement ride”

any **mechanised or power-driven** device designed to **carry patrons on a fixed or restricted course**, or within a defined area, for **primary purpose** of giving patrons **amusement**, pleasure, thrills or excitement and made **available for public use**

- Basic definition of an amusement ride will cover these **4 main aspects**:
  - **Mechanised or power-driven**
  - **Primary purpose of amusement**
  - **Carry patrons on a fixed/restricted course**
  - **Available for public use**

Examples:

- Bumper cars
- Cable ski
- Carousel
- Drop tower
- Ferris wheel
- Flume ride
- Go-karts
- Gyro tower
- Motion-based simulator
- River rafting ride
- Roller coaster
- Roundabout
- Swinging ride
- Train (Choo-choo train)



# Inclusion Schedule

- to regulate devices that do not fit basic definition, mainly non-powered, gravity-driven rides
- inclusion criteria include **acceleration profile, height/vertical displacement measured** etc.

- Aerial ropeway/funicular
- Air-inflated enclosure
- Bungee device
- Human-powered carriage ( $\geq 5\text{m}$  above ground or floor level)
- Skydiving device
- Inflatable – Land/Water
  - Roof space  $\geq 30\text{sqm}$ ; or
  - Escape distance/Liner dimension  $\geq 15/7\text{m}$
  - Patron vertical displacement  $\geq 5\text{m}$ ; or
  - Total area  $\geq 150/15\text{sqm}$
- Jump/free fall jump device
- Luge
- Non-powered roller glider
  - Patron vertical displacement  $\geq 5\text{m}$ ; or
  - Patron is  $\geq 10\text{m}$  above access level; or
  - There is no such access level
- Reverse bungee device
- Play net
  - Horizontal + Patron vertical displacement  $\geq 5\text{m}$ ; and
  - Total area  $\geq 150\text{sqm}$
- Static simulator
  - Acceleration in Area 3-5 or
  - Tilt  $\geq 60$  degrees about a horizontal or inclined axis
- Trampoline bungee
- Wave-surfing device
- Water slide
  - Patron vertical displacement  $\geq 5\text{m}$ ; or
  - Has additional mech/elec propulsion device
- Zip line
  - Patron vertical displacement  $\geq 5\text{m}$ ; or
  - Patron is  $\geq 10\text{m}$  above access level; or
  - There is no such access level

# Exclusion Schedule

- to exclude rides under our definition that are low risk

1. Any power-driven amusement rides that has a total motive power rating  $\leq 1.1\text{kW}$ , except:

- a) mechanical simulator
- b) go-karts
- c) bumper cars
- d) power-driven roller gliders

2. Lazy river ride

3. Wave pool

This means that **Mechanical simulator, go-karts, bumper cars and power-driven roller gliders** of total motive power rating  $\leq 1.1\text{kW}$  **will be regulated**



# Clarification on Inclusion Criteria of Specific Rides

## “Inflatable in Second Schedule [Land]”



An inflatable, **or a group of inflatables** used together will be regulated as an amusement ride  
- Kept **inflated by air blowers**

### Inclusion Criteria for use on *land*:

- a) With enclosed space that is fully or partially roofed over or covered,
  - 1) with base area  $\geq 30\text{m}^2$ ; or
  - 2) **the distance between the most remote point and the nearest exit  $\geq 15\text{m}$ ;**
- b) Maximum vertical displacement  $\geq 5\text{m}$   
**regardless of enclosure coverage;**
- c) Projected **base area  $\geq 150\text{ m}^2$** , whether or not the inflatable has any enclosed space.



# Clarification on Inclusion Criteria of Specific Rides

## “Inflatable in Second Schedule [Water]”



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

- a) Maximum vertical displacement  $\geq 5\text{m}$  **regardless of enclosure coverage;**
- b) Projected base area  $\geq 15\text{ m}^2$ , whether or not the inflatable has any enclosed space; or
- c) The largest linear dimension of the projected base of the inflatable  $\geq 7\text{ m}$ .



# Clarification on Inclusion Criteria of Specific Rides

## “Air-Inflated Enclosure in Second Schedule”

Definition for air-inflated enclosure:

- Air-inflated enclosures will be regulated if 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**



# Clarification on Inclusion Criteria of Specific Rides

## “Play Net in Second Schedule”



“**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):

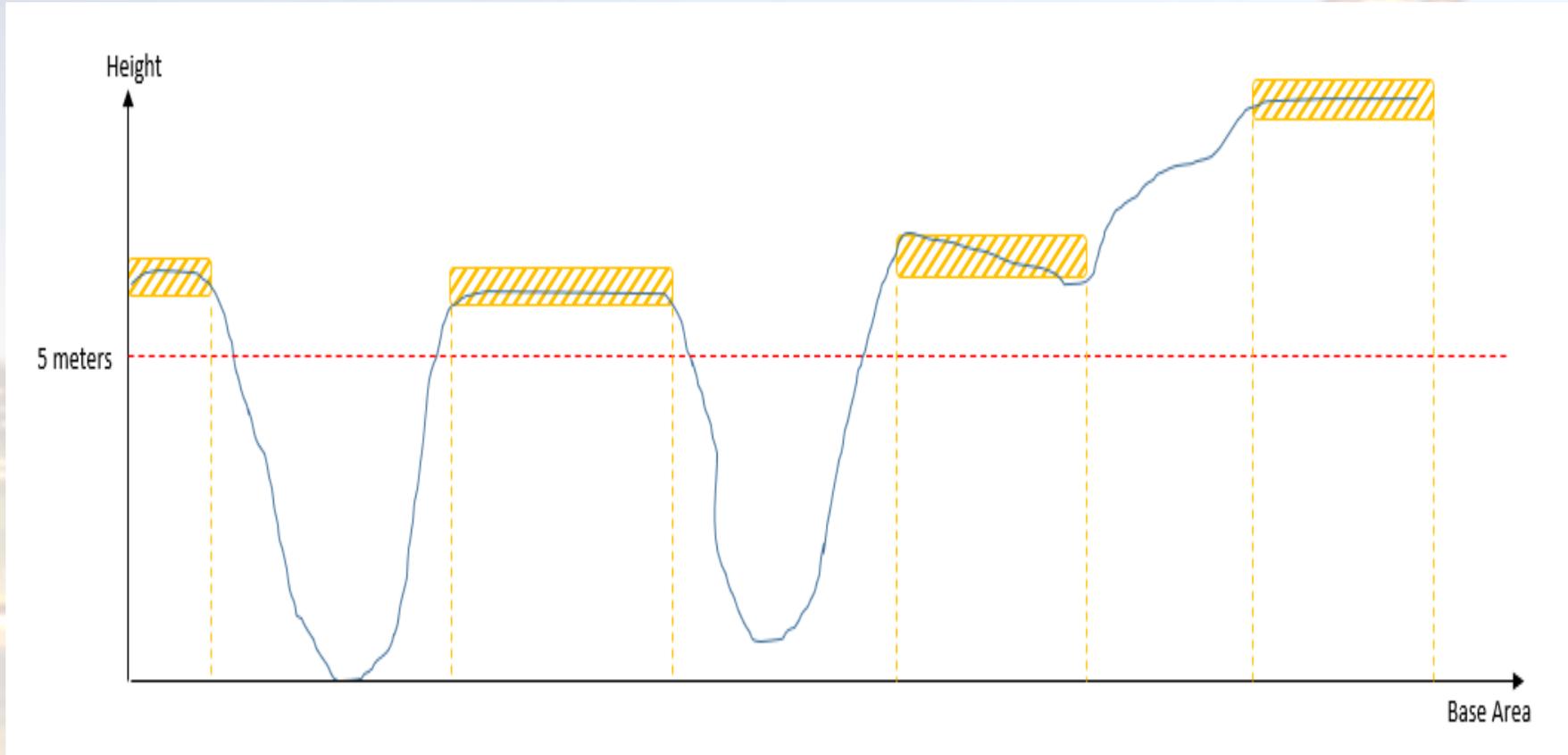
Where at least **150 square metres** of its total area is installed —

- (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.

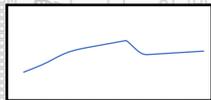


# Clarification on Inclusion Criteria of Specific Rides

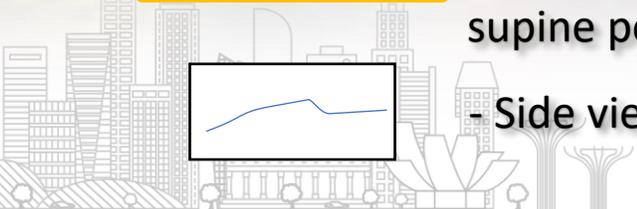
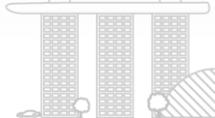
## Play net Inclusion Criteria



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



- Side view/profile of play net



# Clarification on Inclusion Criteria of Specific Rides

Clarification on 4 types of rides below 1.1KW in Third Schedule:

- **Mechanical simulator, go-karts, bumper cars and power-driven roller gliders** of total motive power rating  $\leq 1.1\text{kW}$  are not excluded from the regime and **will be regulated**



# General Parameters Considered for Regulating Rides

**Consult BCA as soon as possible if you have any clarifications regarding an amusement device**

- **Acceleration**

- Corresponding to Area 3, 4 or 5 in the Restraint Diagram through mechanised power or gravity driven means experienced by the patron; or

- **Height**

- Vertical displacement of a patron through the course of the ride/potential fall from height through patron's use exceeding 5 metres; or

- **Escape/Rescue Complexity**

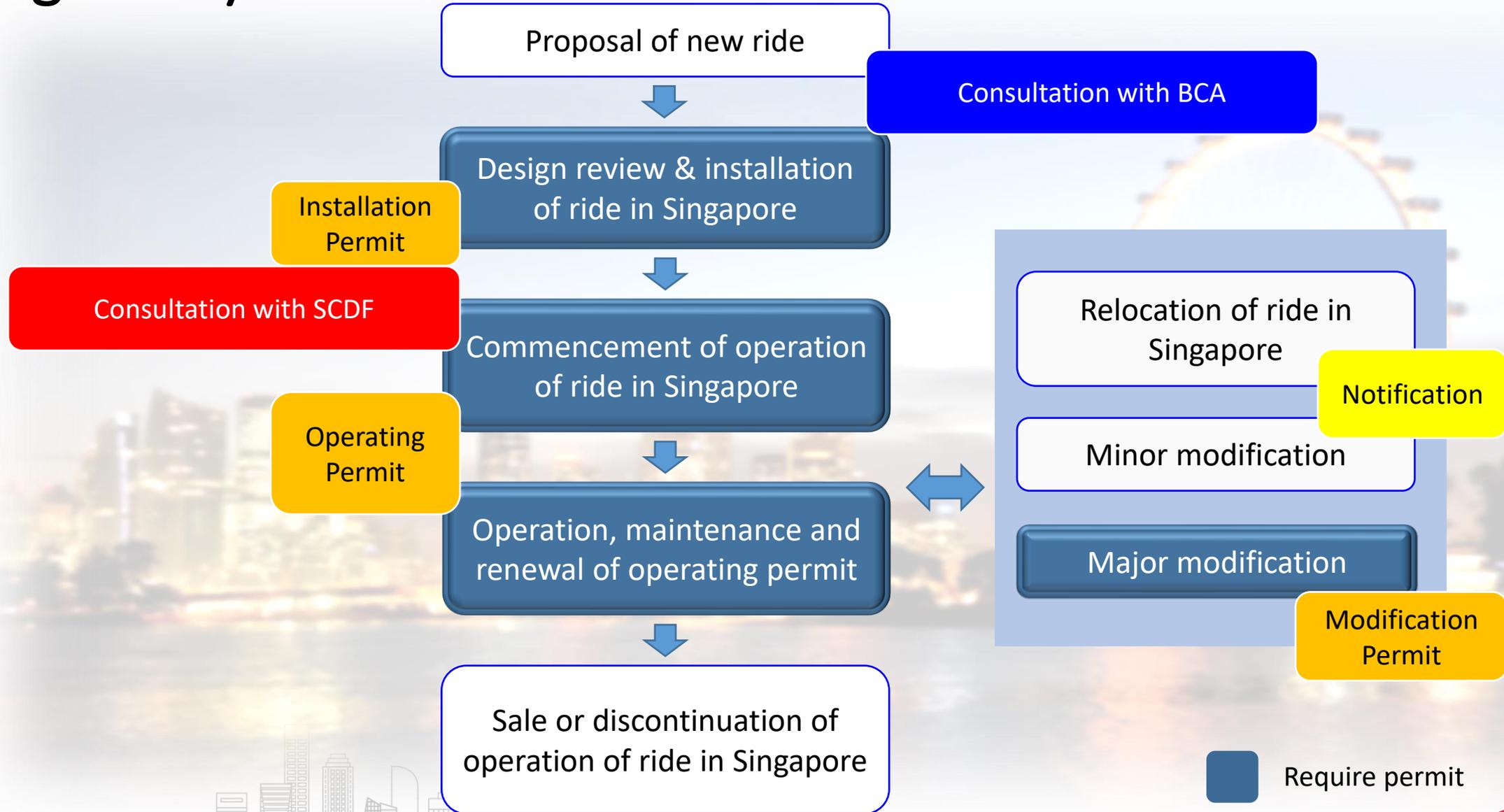
- Rides where there is a great risk of patron experiencing suffocation/drowning, difficulty in escaping during fire emergencies or complicated rescue methods



# Reminder on the Regulatory Requirements for Amusement Rides

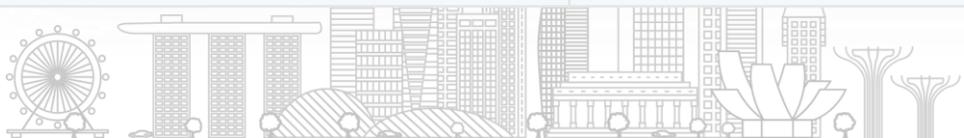


# Regulatory Process



# Engineering Standards and Codes

Standards / Codes	Rides
ASTM F24 Stds / EN 13814	Air inflated enclosures, bumper cars, carousel, drop tower, ferris wheel, flume ride, go-karts, gyro tower, human-powered carriage, skydiving device, jump/free fall jump device, luge, motion-based simulator, river rafting ride, roller coaster, roundabout, static simulator, swinging ride, train, trampoline bungee, wave-surfing device, any other ride
Rides	Standards / Codes
Aerial ropeway/Funicular	ANSI B77.1 / CSA Z98-07 / EN 12929 (Parts 1 and 2)
Bungee device	AS/NZS 5848
Inflatable	ASTM F24 Stds / EN 14960
Play net	(i) ASTM F1487 / EN 1176 (ii) ASTM F24 Stds / EN 13814
Reverse bungee device	(i) AS/NZS 5848; and (ii) ASTM F24 Stds / EN 13814
Water slide	ASTM F24 Stds / EN 1069 (Parts 1 and 2)
Zip line	EN 15567 (Parts 1 and 2) / AS 3533 / Ropes Challenge Course and Zip Line Canopy Tour (Adventure Aerial Park) Standards / Challenge Course and Canopy/Zip Line Tour Standards / ASTM F24 Stds



# Stakeholders & Duties

## installation permit

- *appoint qualified person for installation permit*

## operating permit

- *appoint QP for permit renewal*
- *appoint ride managers*
- *overall control and management for ride operation and safety*
- *ensure valid insurance*

## modification permit

- *appoint qualified person for modification permit*

### PERSON RESPONSIBLE / PERSON APPLYING FOR PERMIT

- *Oversee, manage & supervise daily routine operation and maintenance*

### RIDE MANAGER

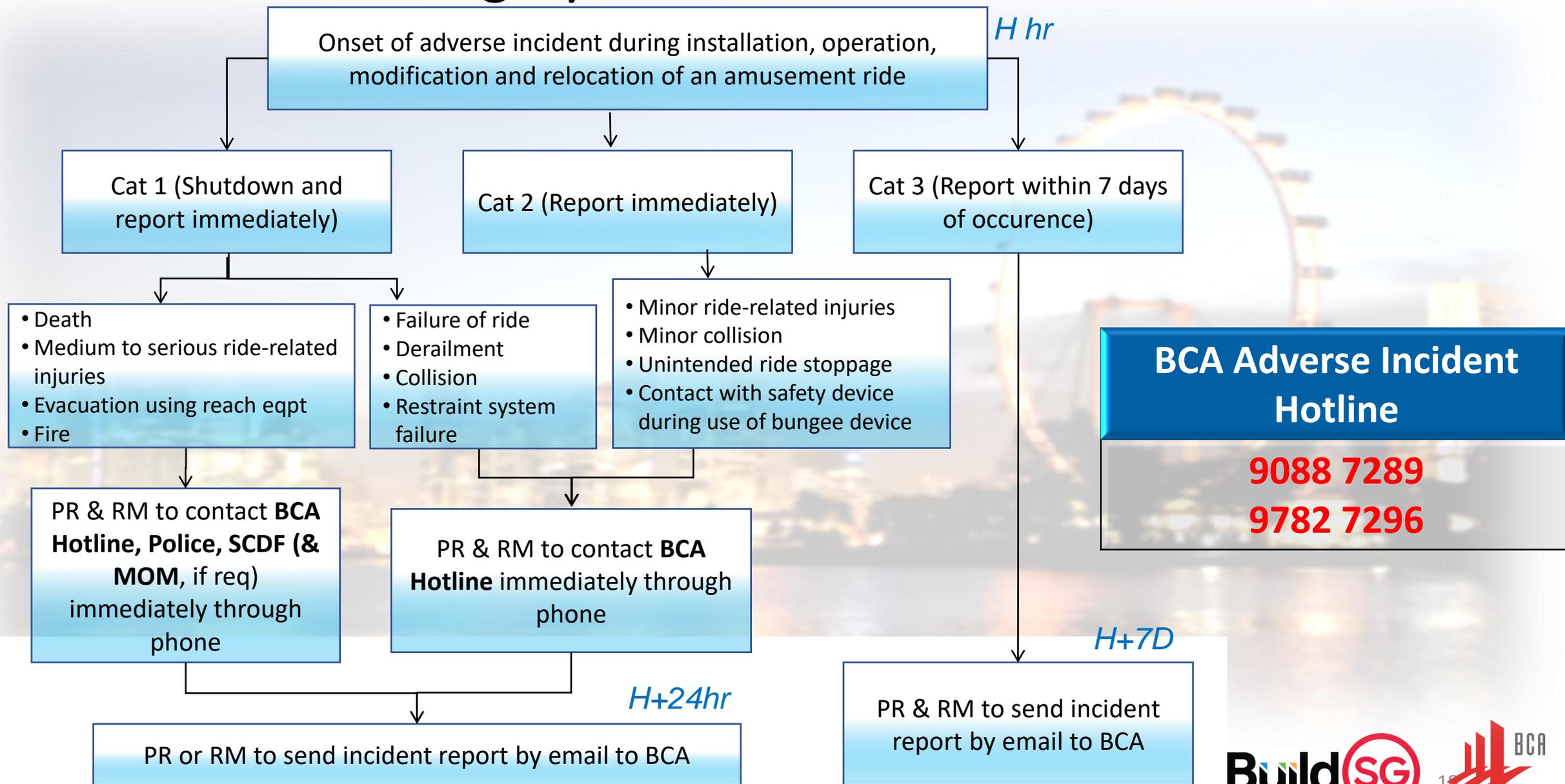
- *certify technical requirements*
- *supervise installation and tests*

- *certify annual checks and tests*

- *certify technical requirements*
- *supervise modification and tests*

### QUALIFIED PERSON [QP] (+ CONFORMITY ASSESSOR\* FOR MAJOR RIDES)

# Adverse Incident Category & Contact Numbers



# Examples of Unauthorised Rides Operating without Valid Permit

“**mechanical simulator**” means a device —

- (a) that consists of a unit in the shape of an animal, a saddle, a seat, a surfboard or any 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

- **Rodeo Bull** is a type of **mechanical simulator** and will be regulated regardless of its total motive power rating (i.e. will be regulated even if its total motive power rating is below **1.1kW**)



# Examples of Unauthorised Rides Operating without Valid Permit

“**inflatable**” means a device that is —

- (a) fabricated from flexible material;
- (b) kept inflated by one or more blowers and relies on air pressure to maintain its shape; and
- (c) intended to be used for bouncing on, climbing, sliding or interactive play for the amusement or entertainment of patrons

- Another common unauthorised ride BCA encounters is land inflatables, **or a group of inflatables** used together
- Regulated if they are:
  - Kept **inflated by air blowers**
  - Projected **base area  $\geq 150 \text{ m}^2$**
  - Maximum vertical displacement  **$\geq 5\text{m}$**
  - **Base area  $\geq 30\text{m}^2$**  or distance between the most remote point and the nearest exit  **$\geq 15\text{m}$**  if enclosed space is fully or partially roofed over or covered,

# Examples of Unauthorised Rides Operating without Valid Permit

## Human-powered Carriage:

- A device consisting of a **carriage or vehicle** for the carriage of patrons that is **manually powered**, and that **moves on or is suspended from an elevated track**, or is by some other means elevated above ground or floor level
- Examples of a carriage or vehicle includes bicycles and skateboards, and will be considered a human-powered carriage if they move on or are suspended from an elevated track and are above **5 metres from the ground**



# Conclusion

- Be aware of the definition of an amusement ride as well as the Inclusion and Exclusion list
- Note the inclusion criteria of specific rides
- Consult BCA as soon as possible if you have any clarifications regarding an amusement device
  - For new operators, please seek clarification or consult BCA using our BCA feedback form <https://www2.bca.gov.sg/feedback/>
  - For existing operators, you may check with your BCA Account Managers



# Thank you



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