



INTERNATIONAL BEST PRACTISE AND STANDARDS REQUIREMENTS LEISURE INDUSTRY –“RIDES AND WATER PARKS”- SAFETY

Ralph Pesgens

IAAPI – MUMBAI, September 2019

SAFETY CONCLAVE

26 SEPTEMBER, 2019

THE ORCHID HOTEL | MUMBAI

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MEDIA HEADLINES JULY AUGUST 2019TD

- 1. Boy, 7, falls from rollercoaster**
- 2. 28 injured in Tagada seat collapse**
- 3. Worker loses leg during carnival ride maintenance**
- 4. Woman falls from ride in Mexico**
- 5. Cables snap on Free Fall towers**
- 6. Woman killed in pendulum ride collapse**
- 7. Two dead, fifteen injured in pendulum ride collapse**
- 8. Boy, 9, injured when two carnival rides collide**
- 9. Man breaks spine on waterslide**
- 10. 44 injured in wave-pool 'Tsunami' malfunction**
- 11. Rollercoaster de-rails - 3 injured**

MEDIA HEADLINES 2016-2019YTD

Carousel worker killed - crushed under deck	Bungy cord snaps on sling shot catapult ride	Ride spins out of control so fast it "becomes a blur" as gearbox fails	Four children injured in ride breakage
6 children thrown out of ride	Rollers evacuated from Wipeout carnival ride	Rollercoaster test run leaves one worker dead, one injured	Two Zipper cars collapse in fair ride malfunction
Boy, 12, injured in fall off log flume ride	Boy falls from Zipper as door and harness comes open	Girl injured after falling off 'Swinger' ride	Amusement park log flume ride derails
Icelandic parents accuse Spanish theme park of killing their son	Girl scalped on ferris wheel in India	Child injured on fun-house slide	Girl dies after falling from mother's lap on ride
Teen crushed to death after falling off pirate ship ride	Child falls from swing ride	9-year-old falls from zipline, breaks leg	Teen throws 8-year-old boy off waterslide
Man falls to death from ride after belt harness breaks	9 hospitalized after house of horrors stair collapse	Two people in passenger tub break off of Calypso ride	Girl falls from carnival ride
Teen killed on Rok 'n' Roll-style carnival ride	Four people killed on Thunder River Rapids ride at Australia's Dreamworld theme	4 seriously injured, 1 in coma, after thrill ride collapses	Woman's finger ripped off after ring catches on waterslide
Two riders injured when cart snaps off 'Shake' carnival ride	Spider ride arm snaps at Mundo Aventura, 10 injured	Carnival worker dies from ferris wheel fall	Four teens ejected from fair ride after safety bar breaks
Girl killed in tragic inflatable wind-gust	Sizzler carnival ride malfunctions - several injured	Fair worker falls from tipped ferris wheel car carrying children	5-year-old girl hit by falling metal off ferris wheel
Disneyland employee found dead inside Haunted House	Carnival worker dies after being hit by ride	Man killed by coffin in 'Buried Alive' haunted house ride	Worker injured while constructing Fireball ride
Worker killed assembling fair ride	Girl flung to her death on "Space Adventure" ride	Paratrooper seat detaches during ride	Several children bruised and shaken after Tilt-a-Whirl car tips
Flying Chairs accident leaves 12 injured	Tagada ride breaks off mid-ride - 12 injured	Bearing breaks on Sizzler ride – riders receive minor injuries	Woman falls to her death on giant swing
Ferris wheel ejects riders - one dead	Worker falls to death while dismantling carnival ride	Girl injured on Gravitron 'Starship 3000' ride	19 riders stranded when 'El Nino' fair ride malfunctions
Man nearly drowns on log flume ride	Chinese Sky Flyer ride crashes to ground, injuring nine	12-year-old boy's leg cut off on alpine-coaster	Man hits head, becomes unconscious on Tagada ride
2 injured on Ferris Wheel	Fair worker hit by part of rollercoaster	10-year-old falls from Ferris Wheel	Boy dangles 138ft from Ferris wheel in China
Girl Dies After Being Ejected From Sizzler Ride	Adult, 2 children injured in bounce house wind gust	Six injured in 2 serious ride accidents	Wave-swinger collapses; 13 injured
Ferris wheel catches fire	Waterworld sued over Tornado slide injury	Swing ride tips over	Ride safety bars open while 10 upside-down
Zipper leaves boy hanging on 20ft in air	Man hit by pigeon on opening day of 111mph (180kmh) rollercoaster	Waltzer car comes off fairground ride	Man injured on 'Indy 500' fairground rollercoaster
Several injured when Six Flags rollercoaster stops mid-point, derails	Riders injured in rollercoaster collision	Girl flung from fair ride breaks nose	8 injured in inflatable slide collapse
Girl falls from carnival ride - fractures skull and loses hair	Thrill-seeker within inches of death as harness fails on bungee swing	20 people stuck in air on carnival ride	Several hurt when SkyFlyer chairs collide with fences
Bounce house blows away injuring 10	Video shows moment disabled man plummets 32ft from rollercoaster	Six people fall to the ground in chairlift accident	Teen ejected from 'Spin Out' carnival ride
Girl aged 6 breaks neck on water slide	Boy critically injured after falling from carnival ride	15 injured in Octopus ride collapse	Ferris Wheel riders ejected after gondolas tip over
Man dies in amusement park test-ride gone wrong	Bungy-jumper crashes 50ft into river bed when rope too long	Couple falls from amusement park ride	Ride attendant thrown from Waltzer ride
Roller coaster rider sues Six Flags after flying cell phone injury	10 injured when free-fall cable snaps	Chainsaw-wielding clown cuts open teenager's face	Teen Survives 130ft Drop From Fairground Ride
Ride that injures senior citizens called a lawnmower covered in fiber	Bouncy castle launches into air, killing girl, 6, and injuring six other childre	Nine injured on air-bounce ride after power failure	8 rescued by helicopter from 170 feet thrill ride
Disney lawsuit after woman hit by California Screamin' rollercoaster	Girl, 11, dies after falling from Splash Canyon 'river rapids' ride	Man injured after boy divebombs him on waterslide	Hurricane ride hits rope, fences - 5 injured
Ghost train cart derails - falls 10 feet	Fence at carnival charged with electricity - shocks toddler	Man dies at trampoline park	Ten children injured when carnival ride speeds out of control
Adventureland worker dies on ride - after 6 days on the job	3 fall out of Ferris Wheel	Man claims he contracted eye-eating parasite from rapids ride	Worker's hand severed during ride inspection
Carnival worker electrocuted during ride setup	Boy falls to death on Zipper ride	Ski lift roll-back malfunction sees 11 riders injured	Man who fell 20ft off Bungee Trampoline sues cruise ship for \$10M
Carnage as rollercoaster derails and plunges 20ft to the ground	Boy, 10, flung from waterslide on park opening day	Dad killed in French fairground ride collapse	Woman falls from rollercoaster
Woman thrown from alpine coaster toboggan	Freak wind gust sends bounce houses and children flying	Girl killed in Wacky Worm coaster derailment	Two injured in Paratrooper collapse
Carnival worker hit by Speed ride	Boy, 12, almost goes blind after fracturing skull on Tagada ride	Woman in critical condition after being ejected from funfair ride	2 killed, 22 injured during 'dust devil' inflatable wind gust
Cable detaches on Six Flags Goliath coaster	Man falls out of looping ride when harness fails	Worker dies in fall off 'Ring Of Fire' ride	8 injured in 'caterpillar' ride derailment
Double Tragedy - how 2 children died on a tea cups ride	Five dead in waterpark tragedy after owner, son and three teens electrocuted in	'Move It' riders crash into platform	Teen's legs injured after ride foot-rest breaks off
8-year-old boy dead after incident at Knobels 3ft swimming pool	Teen girl falls 25-foot from Six Flags 'Sky Ride'	One dead in Spaceloop ride restraint failure	Woman falls 30-feet in adventure park fall
Man flies out of water slide	7 dead in cable car accident	Amusement park worker run-over by coaster train	Mom and son ejected from aerial chair-swing ride
Two children injured on Fly-o-Plane ride at Lake Winnie	Bungee jumper plunged to her death due to instructor's 'poor English'	Wind sends boy in bounce house flying into car on Highway	Ferris Wheel owner killed in fall during ride de-construction
Girl breaks arm on Frog Hopper ride	Girl falls off water slide	Sky Diver ride tips over in tornado windgusts	Two dead, 12 injured on 'world's longest slide' collapse
Man falls out of seat on inverted swinging ship	Seven injured when carnival ride almost topples	Woman ejected from Shake ride	31 people rescued from semi-inverted carnival ride
Woman's seat breaks off 90ft free-fall tower	5-year-old run over by carnival ride while operator on cell phone	Sizzler ride malfunctions, four injured	Two injured in Octopus arm collapse
Five hurt when Octopus carnival ride malfunctions	Rollercoaster collision leaves 33 injured	3 dead, 2 injured in rollercoaster collision with crane	Two adults and child ejected from Log Flume ride
10-Year-Old boy killed riding on world's tallest water slide	One killed, three injured in Wacky Worm rollercoaster derailment	1 Killed, 6 Injured in ferris wheel accident in India	Boy, 7, falls from rollercoaster
3 girls ejected; fall 45ft from Ferris Wheel	Woman dead after falling out of 'Sling Shot' ride	Seven People injured in Fire at Europa-Park, Germany	28 injured in Tagada seat collapse
3-year-old boy falls from rollercoaster at Idlewild amusement park	Child falls from new amusement ride	Boy, 7, killed after bouncy castle upended in China	Worker loses leg during carnival ride maintenance
6 children receive electric shock on Scrambler amusement ride	Ohio fair tragedy: One dead, more fighting for life after amusement ride breaks	Bumper car catches on fire at Carowinds	Woman falls from ride in Mexico
Carnival worker electrocuted on bumper car ride	Paratrooper ride breaks - 13 injured	Rollercoaster train falls off, two riders ejected	Cables snap on Free Fall towers
Teenage boy killed on Tagada ride	Waterslide leaves teen with stitches	Girl dies after inflatable 'explodes' in the UK	Woman killed in pendulum ride collapse
Lifeguards found drowned man by accident in amusement park pool	Girl falls off ride - breaks both arms.	Tilt-a-Whirl car comes off - four injured	Two dead, fifteen injured in pendulum ride collapse
Riders thrown off Tagada ride when seat rail breaks off	Worker hit and killed by rollercoaster	Fair ride malfunctions, leaving rider upside-down	Boy, 9, injured when two carnival rides collide
8 Injured in Tennessee Fair ride accident	21 people injured in sky-flyer malfunction	Boy killed, 1 seriously injured in fair ride malfunction in Poland	Man breaks spine on waterslide
One dead, 11 injured after falling out of amusement park ride in Pak	Carnival ride collapses - 2 injured	Ride collapse in Pakistan kills 1, injures 25	44 injured in wave-pool 'Tsunami' malfunction
			Rollercoaster de-rails - 3 injured

MEDIA HEADLINES 2016-2019YTD

Media Headlines 2016 – 2019 ytd (no official survey)

- 205 accidents
- 687 people Injured
- 96 Fatal Injuries

Modern park equipment can cause catastrophic, multi fatality accidents. Low Risk – High consequence for Industry

Carnival worker killed - crushed under deck	Bungee cord snaps on sling shot catapult ride	Ride spins out of control so fast it "becomes a blur" as gearbox fails	Four children injured in ride breakage
Boy, 22, injured in fall on log flume ride	Child dies after falling off 'Swinger' ride	Zipper coaster test run leaves one worker dead , one injured	Two Zipper cars collapse in fair ride malfunction
Boy, 12, injured in fall on log flume ride	Boy kills Mom Zipper as door and harness comes open	Girl injured after falling off 'Swinger' ride	Amusement park log flume ride derails
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Two riders injured when cart snaps off 'Shake' carnival ride	Four people killed on Thunder River Rapids ride at Australia's Dreamworld theme park	4 seriously injured, 1 in coma, after thrill ride collapses	Woman's finger ripped off after ring catches on waterslide
Girl killed in traffic inflatable wind gust	Spider ride arm snaps at Mundo Aventura, 10 injured	Carnival worker dies from ferris wheel fall	Four teens ejected from fair ride after safety bar breaks
Worker killed as swinging rail ride	Sizzler carnival ride malfunctions - several injured	Fair worker falls from tipped ferris wheel car carrying children	5-year-old girl hit by falling metal off ferris wheel
Flying Chairs accident leaves 12 injured	Carnival worker dies after being hit by ride	Man killed by coffin in 'Buried Alive' haunted house ride	Worker injured while constructing Fireball ride
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Ferris wheel catches fire	Chinese Sky Flyer ride crashes to ground, injuring nine	12-year-old boy's leg cut off on alpine-coaster	Man hits head, becomes unconscious on Tagada ride
Several injured in water slide roller coaster stalls and derails	Fair worker hit by part of rollercoaster	10-year-old falls from Ferris Wheel	Boy dangles 138ft from Ferris wheel in China
Girl falls from carnival ride - fractures skull and loses hair	Adult, 2 children injured in bounce house wind gust	Six injured in 2 serious ride accidents	Wave-swingers collapse; 13 injured
Bouncy castle collapses on child	Waterworld sued over Tornado slide injury	Swing ride tips over	Ride safety bars open while 10 upside-down
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One dead , 11 injured after falling out of amusement park ride in Pak		Rollercoaster train falls off, two riders ejected	Cables snap on Free Fall towers
		Girl dies after inflatable 'explodes' in the UK	Woman killed in pendulum ride collapse
		Tilt-a-Whirl car comes off - four injured	Two dead , fifteen injured in pendulum ride collapse
		Fair ride malfunctions, leaving rider upside-down	Boy, 9, injured when two carnival rides collide
		Boy killed , 1 seriously injured in fair ride malfunction in Poland	Man breaks spine on waterslide
		Ride collapse in Pakistan kills 1, injures 25	44 injured in wave-pool 'Tsunami' malfunction
			Rollercoaster de-rails - 3 injured

CAUSES OF THEME PARK ACCIDENTS

■ Mechanical failure of the amusement ride



- Year: 2016
- Location: Scotland
- Cause: Wheel break of train derailed
- Injured: 10
- Killed:

■ Defective design or manufacture of the ride



- Year: 2016
- Location: USA
- Cause: Hi speed, ejected from boat
- Injured:
- Killed: 1

CAUSES OF THEME PARK ACCIDENTS

■ Operator error or inattentive behavior



- Year: 2016
- Location: Nigeria
- Cause: Operator starts ride by mistake during dis-embarking
- Injured: 6
- Killed: 2

■ Inadequate security or inadequate supervision



- Year: 2018
- Location: China
- Cause: 5-Y/O Boy alone in 50 MT Wheel
- Injured: 1
- Killed:

CAUSES OF THEME PARK ACCIDENTS

- Failure to follow guidelines for minimum & maximum height, weight or age restrictions



- Malfunction of safety restraints/ belts/ lap bars



- Year: 2018
- Location: Germany
- Cause: Rider too heavy to close lap bar properly, ejected from ride
- Injured: 1
- Killed: 0

- Year: 2018
- Location: Mexico
- Cause: Restraint opened during operation
- Injured: 1
- Killed: 1

CAUSES OF THEME PARK ACCIDENTS

- Poorly maintained or assembled rides



- Year: 2017
- Location: USA
- Cause: Gondola breaks off Ride
- Injured: 3
- Killed: 2

- Missing or defective safety equipment



- Year: 2016
- Location: Australia
- Cause: Safety Stop not used/bad maintenance
- Injured: 3
- Killed: 4

CAUSES OF THEME PARK ACCIDENTS

- Inadequate staffing or improperly trained staff



- Year: 2015
- Location: UK
- Cause: Bad Communication operators, overruling safety system
- Injured: 16
- Killed:

- Exposed electrical wiring



- Year: 2017
- Location: USA
- Cause: 15 Month old kid hold aluminum fence
- Injured: 1
- Killed:

CAUSES OF THEME PARK ACCIDENTS

- Failure to properly warn of dangerous or off-limits areas



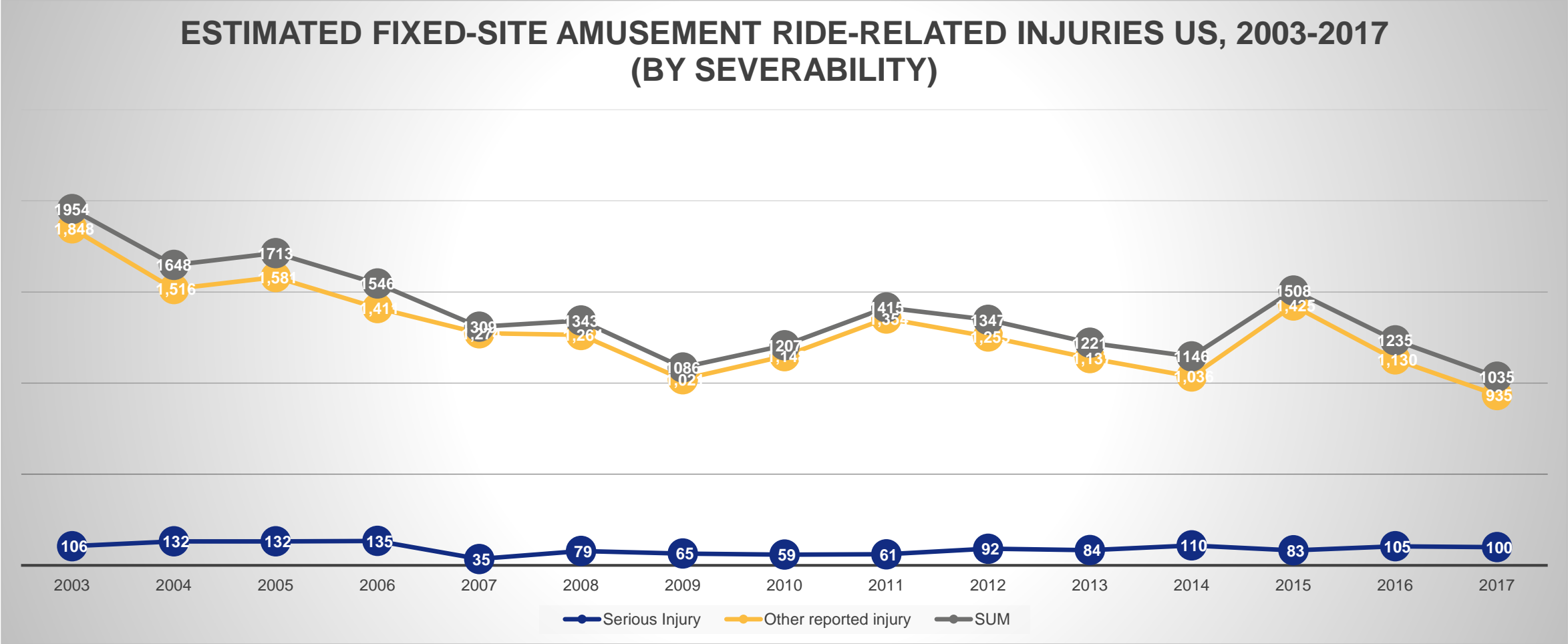
- Year: 2015
- Location: USA
- Cause: Passenger climbs fences into restricted Area
- Injured:
- Killed: 1

- Failure to warn riders of restrictions including those for pregnant or infirm riders



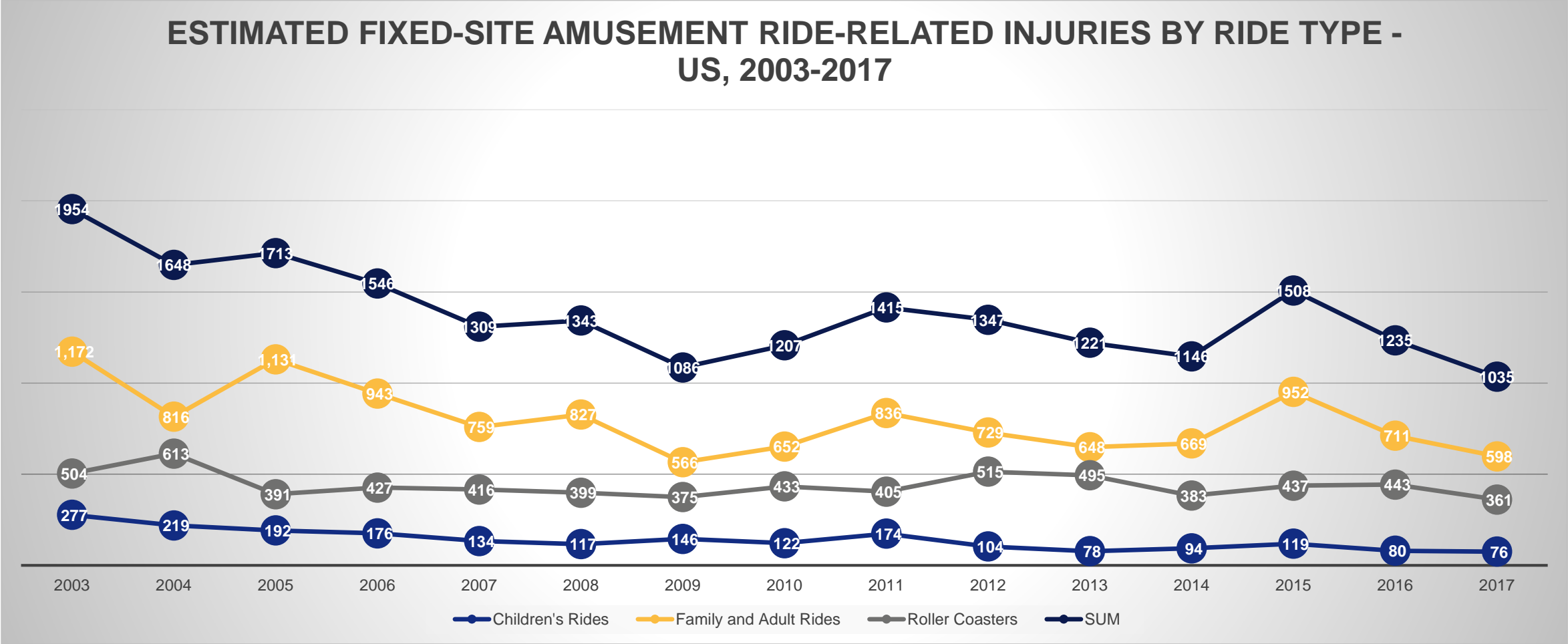
- Year: 2017
- Location: Colombia
- Cause: disabled man plummets 32ft from rollercoaster
- Injured:
- Killed: 1

ACCIDENT STATISTICS USA – 2003-2017



Source: National Safety Council estimates based on annual fixed-site amusement ride injury surveys.

ACCIDENT STATISTICS USA – 2003-2017



Source: National Safety Council estimates based on annual fixed-site amusement ride injury surveys.

EFFECT OF THEME PARK ACCIDENTS

Direct Costs:

- Cease of Operation
- Repair
- Medical
- Workers' Compensation
- Cost of Insurance

Indirect Costs:

- Reduced employee moral
- Down time
- Cost of hiring/training
- Business interruption
- Legal fees/Liability/Increase Insurance
- Negative public image/Long legal processes
- Investigation
- Overtime
- Extra supervisor time
- Damage to the industry

- Loss of Goodwill
- Loss of Market
- Loss of Customers
- Loss Of Shareholders Value
- Loss of Key-Employees

Source: Treend/Harris IAAPA Expo 2015

EFFECT OF THEME PARK ACCIDENTS

■ AMUSEMENT PARK IN AUSTRALIA

- October 25, 2016
- Two men and two women were killed on the Thunder River Rapids when their raft collided with another near a large conveyor belt at the end of the ride.

Posted 26 Oct 2016, 7:51am

Dreamworld's share price has plummeted in the wake of Tuesday's deaths at the Gold Coast theme park.

Ardent Leisure, which owns Dreamworld, lost \$140 million on Tuesday afternoon as its stock plunged by almost 8 per cent from \$2.55 to \$2.35.

Shares slipped further on Wednesday morning's trade to \$1.86 and, despite making some gains mid-morning, closed down 14.9 per cent at \$2 — the lowest close since July 13, 2016, and the biggest one-day loss since it fell 19 per cent in March 2015.

9Finance > Business News

Dreamworld operator flags potential \$94 million loss as visitors slow to return

 By Stuart Marsh · Jul 30th, 2018

Dreamworld's owner Ardent Leisure has flagged a full-year loss of between \$84 million and \$94 million as visitors hesitate to return following the fatal Thunder River Rapids Ride tragedy in 2016.

In preliminary results sent to shareholders this morning, Ardent Leisure said a number of factors meant the group was not seeing the same number of visitors as it was prior to the fatal accident.

Thunder River Rapids ride to be demolished

Dreamworld announces it will demolish the water ride at the center of October's deadly accident.

It said the Thunder River Rapids ride would be permanently closed out of respect for the victims and their families.

Source: ABC New Australia Nov-2016

Dreamworld visitor numbers were regularly being released to the Australian Stock Exchange by Ardent Leisure until the middle of this year.

The June figures - the last ones released - were down 30.5% on the previous year.

Ardent Leisure was not the only company to lose value because of the four deaths.

Village Roadshow Limited, which runs nearby theme parks Warner Bros. Movie World and Wet'n'Wild Gold Coast, has had its share price drop more than 25 per cent over the last 12 months.

In several of its share market announcements, it has attributed poor performance to the Dreamworld accident.

Source: ABC New Australia Oct-2017

What is the impact on tourism?

Gold Coast Tourism said the tragedy contributed to a significant fall in the number of day trippers travelling to the city.

The National Visitor Survey, released in September, shows numbers are down almost nine percent for the year to June.

Chief Executive Martin Winter said he expects this will only be temporary.

"What we have seen is a drop in our drive market and we expect that to bounce back very quickly," he said.

Source: ABC New Australia Oct-2017

EFFECT OF THEME PARK ACCIDENTS

■ AMUSEMENT PARK IN UK

- June 2, 2015
- A loaded train collided with an empty test train, causing serious injuries to 16 riders..

Merlin Entertainments Theme Park Profits Feel Effects of The Smiler Accident

July 27th, 2015

Merlin Entertainments have today issued a [trading statement](#) warning that the performance of its Theme Park Division will be lower than expected following the serious accident on The Smiler on 2nd June.

As a result of a number of factors following the incident, including the five day closure of the park, refunds of tickets and accommodation to guests, suspension of marketing, and the closure of rides at both [Thorpe Park Resort](#) and [Chessington World of Adventures Resort](#), Merlin Entertainments have stated that profits for the Theme Park section of the business is now expected to be between £40m and £50m, down from £87m in 2014. Merlin also stated that profitability could also be affected into 2016.

Since re-opening after the incident, visitor numbers at [Alton Towers Resort](#) have seen a drop compared to what would typically be expected for the summer period with many days seeing queues of under thirty minutes. Other theme parks have also seen a reduction in visitors, although this has been to a much lesser extent than Alton Towers Resort. In a bid to rebuild momentum and re-engage customers the Resort recently launched a new 'Towers Tastic Summer' marketing campaign and it is thought that the Scarefest and Fireworks period could be key in helping encourage guests back to the theme park. However, the Resort continues to come under intense scrutiny from the media with a number of outlets running stories on various occurrences at the theme park (most recently an evacuation on Th13teen's lift hill) many of which, as reported in our [recent editorial](#), are simply the rides engaging safety protocols and staff following procedures for such situations, something which occurs almost everyday in theme parks around the world.

Source: Towers Times July-2015

Staff reveal lasting impact of the 2015 horror smash

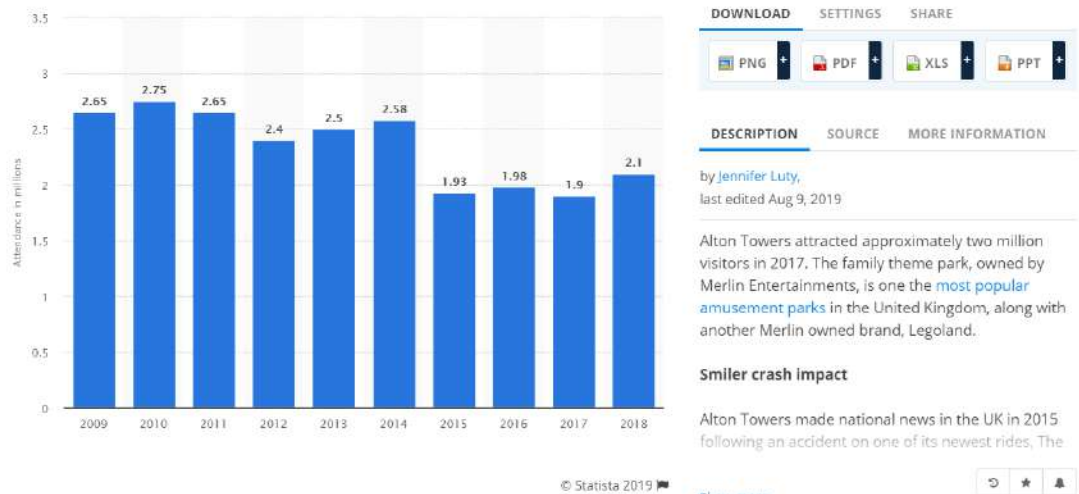
There were serious repercussions for Alton Towers as a criminal investigation found the park guilty of catastrophic failure of health and safety and fined £5million.

New safety measures were brought in and compensation claims are still being assessed, while the park suffered a huge dip in visitor numbers.

According to Statista, attendance figures dropped to 1.93 million in 2015 from 2.58 million in 2014. In 2017, they had risen to 2 million.

Source: Daily Mail AUG-2018

Attendance at Alton Towers theme park in the United Kingdom (UK) from 2009 to 2018* (in millions)



Source: Statista Aug-2019

EFFECT OF THEME PARK ACCIDENTS

■ WATER PARK IN USA

- June 2, 2016
- 10 YO boy was decapitated when the raft he and two women were strapped into "went airborne and collided with the overhead hoops and netting affixed" to the slide. The two women suffered face injuries and lacerations, according to investigators.

Family of Caleb Schwab receives nearly \$20 million in Verrückt settlements



BY STEVE VOCKRODT
svockrodt@kcstar.com

May 04, 2017 06:00 AM
Updated May 05, 2017 07:13 PM

The family of Caleb Schwab will receive nearly \$20 million in settlement payments from the companies involved in the [10-year-old boy's death on the Verrückt water slide at Schlitterbahn](#) in Kansas City, Kan., last year, The Star has learned from court documents.

It's believed to be the largest settlement of its kind paid in a wrongful death case involving a [minor in either Kansas or Missouri](#).

"I would be shocked if there was a bigger one than that," said Roger Nail, a Kansas City trial attorney.

All told, the settlement amounts total \$19,732,125 to the Schwab family. The breakdown among the four parties is as follows: **Source: The Kansas City Star May-2017**

Schlitterbahn co-owner plagued with financial, legal troubles before murder charge in boy's death

Joshua Fechter , Zeke MacCormack and Patrick Danner | March 31, 2018 | Updated: April 1, 2018 8:12 a.m.

2 Years After Boy's Decapitation on World's Tallest Waterslide, Trial Looms as Ride Is Still Standing

Two maintenance workers at the park, David Hughes and John Zalsman, were charged with misleading investigators.

Tyler Austin Miles, the park's former director of operations, was also indicted for involuntary manslaughter.

Jeffrey Wayne Henry, a co-owner of Schlitterbahn Companies and a designer of the slide, and John Timothy Schooley, also a Verrückt designer, were charged with reckless second-degree murder.

CAUSES AND EFFECTS OF THEME PARK ACCIDENTS



**Safety Isn't Expensive, Its Priceless:
Understanding the True Cost of Incidents**

GLOBAL SERVICES TO THE LEISURE INDUSTRY

■ Park safety assessment and certification*

- Periodic Inspection
- Park maintenance checklist
- Management system auditing
- Operations & Maintenance Training

■ Ride assessment and certification*

- Design review
- Inspection during manufacturing and operation
- Inspection and monitoring during operation

■ Risk assessment*

■ Other Services

- Ride maintenance & operator training
- Hotel safety audits and certification



*Amusement Parks, Water Parks, Playgrounds, FECs, etc

APPLICABLE STANDARDS

■ National Legislation (if Available)

■ European EN Standards:

- EN 13814 Fairground and amusement park machinery and structures
- EN 1176 Playgrounds
- EN 1069 Water slides of 2 m height and more
- EN 1993 Eurocode 3: Design of steel structures
- EN 14960/01.11.2008 Inflatable play equipment
- EN 12572 Artificial Climbing Structures
- EN 15567-1/2 Sport & Recreational facilities/Rope Courses
- EN 14974 Users of roller sports equipment
- EN 15288 1/2 Swimming Pool safety, Design & Water Treatment
- DIN 19036 Ice sport facilities with artificial Ice



■ US-American ASTM Standards:

- F 2291 Standard Practice for Design of Amusement Rides and Devices
- F 839 Guide for Inspections of Amusement Rides and Devices



■ ISO Standards

- 17842-1/3 Operations/Maintenance/Design
- 17929 Bio Mechanics



■ Others

- Australia



EN13814 2019

- EN 13814 (2019) Safety of amusement rides and amusement devices
 - Part 1: Design and Manufacture
 - Part 2: Operation, maintenance and use
 - Part 3: Requirements for inspection during design, manufacture, operation and use

- According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following Countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

NEW RIDES INSPECTION

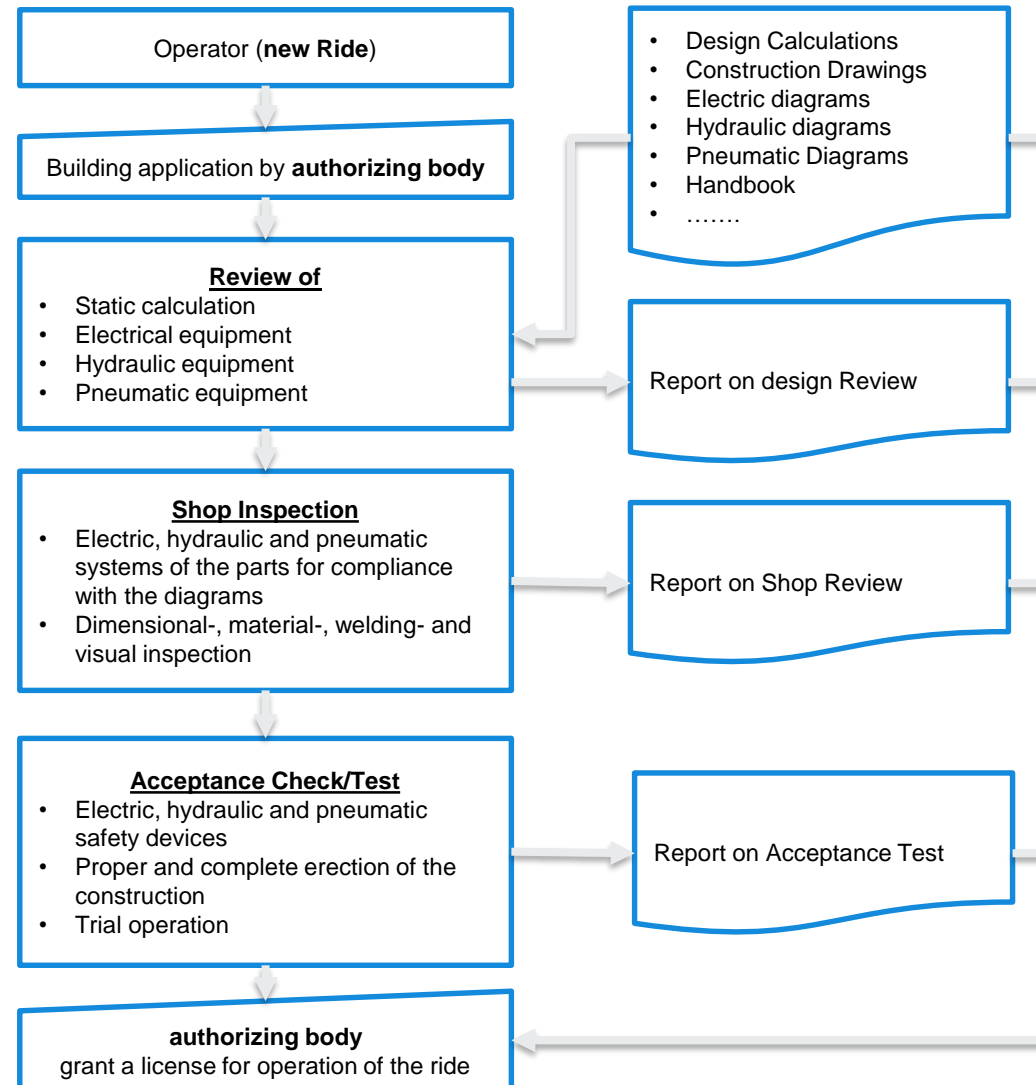
Step 1: Design Review



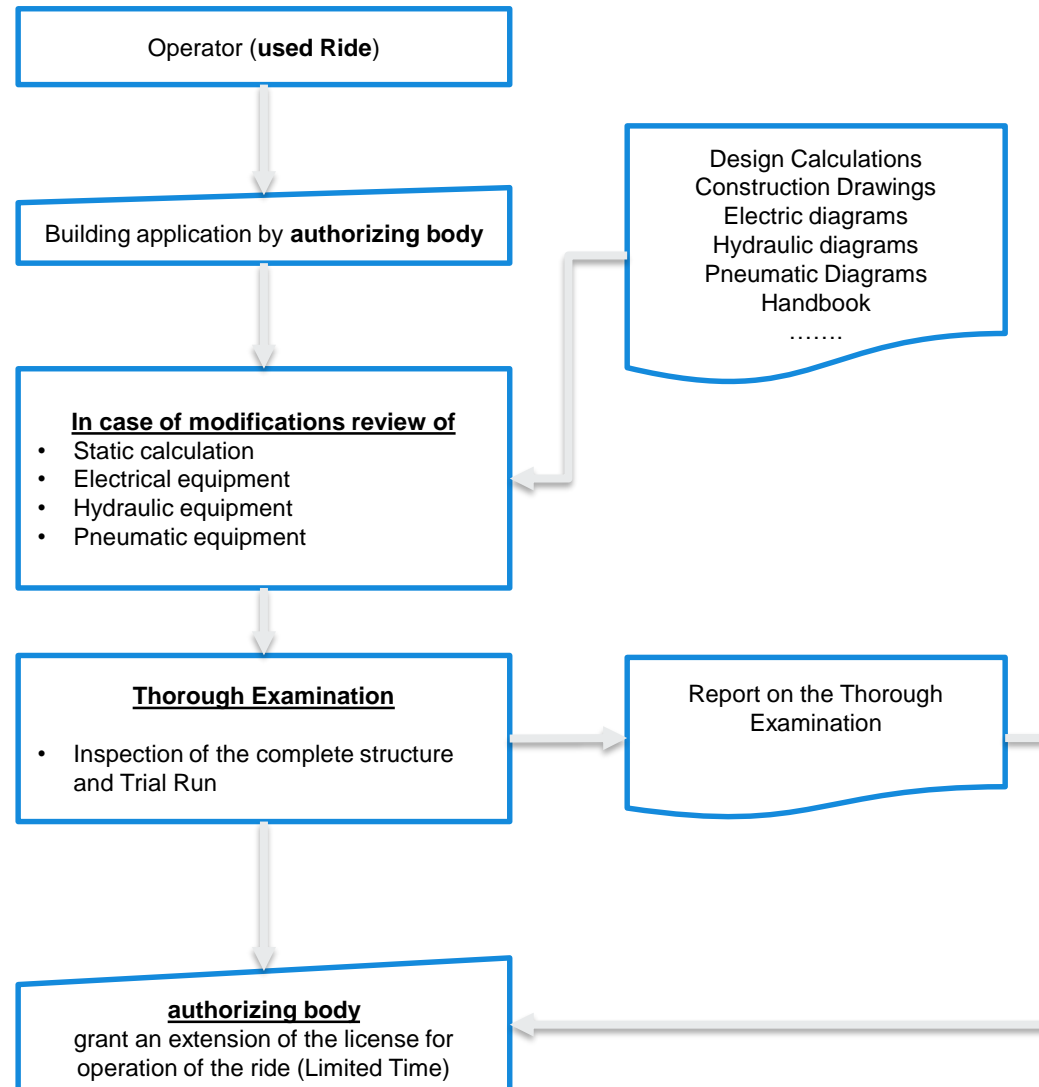
Step 2: Shop Inspection



Step 3: Acceptance Test



PERIODIC INSPECTIONS



IMPLEMENTING STANDARDS

- Recently Implemented
 - Dubai EIAC (formerly DAC)
 - Both EN and ASTM
 - Grace Period
- Currently Implementing
 - Kingdom of Saudi Arabia
 - Indonesia



REFERENCES – LIMITED SELECTION ONLY





Thank You!

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