



## Games Operational Hazard Analysis and Recontextualisation of Hi-Impact Planet Amusement Park and Resort

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**Abstract:** Health and safety are a major concern in developing countries like Nigeria. In the hospitality industry, recreational parks pose a whole lot of risks to all. The rides and games in amusement parks are becoming sophisticated day by day, thereby creating atmospheres where accidents and injuries are becoming rampant. Hence a high degree of safety is essential for all and more reason why this research was set up. In this study, the safety measures of an amusement park, Hi-Impact Planet Amusement Park and Resort were evaluated with the aim of providing risk mitigation best practices in amusement parks. In this analysis, firstly a survey was conducted to assess current health and safety activities via the use of survey questionnaires. Then, operational hazard analysis document was proposed to identify likely hazards and proffer mitigating steps. A standard hazard policy was also formulated. Finally, some recommendations were postulated to improve and enhance existing legal framework.

**Keywords:** Health, Safety, Amusement Park, Games, Accidents, Rides

## INTRODUCTION

Health and Safety are key issues in any organization and this aims at ensuring that both employees and employers are safe at work. However, incidents often occur, causing huge damages to the environment, facilities and even in some cases, fatalities, and disabilities for people as well as huge economic loss (Omoyi, & Adeleke, 2021). Amusement parks' accidents are on the rise and this is caused either by negligence on the part of the operator, maintenance inadequacies, or customers' disobedience to regulations. This should be a concern to all including operators, customers, and stakeholders. Most employers fail to put in place adequate health and safety measures at their workplaces to safeguard not only the employees and management but also clients/customers and other stakeholders who might have some kind of interest in the company or institution. Ineffective occupational health and safety policy have a negative effect on this sector in general to the extent that it has become important that potential risk factors can no longer be ignored. Therefore, it is important to analyse these probable accidents and plan to prevent them by developing a safety culture framework.

Operational Safety is the act of ensuring the health, safety, and wellbeing of people at work (Okuma *et al.*, 2020; Omoji & Omotehinse, 2022). Some of the operational safety in recreational/amusement parks include;

- i. Having a written health and Safety Policy (1);
- ii. Regular Execution of Safety Risk Assessment;
- iii. Strictly following documented procedures and manufacturer's guidelines for ride operations;
- iv. Ensuring that rides' operation team have a considerable amount of experience in operating rides and attractions which ensures safe operating standards; and
- v. Daily, Weekly, Monthly, and Yearly Maintenance are carried out on the amusement rides and games

An amusement park is a park that features various attractions, such as rides and games, as well as other events for entertainment purposes. Unlike temporary and mobile funfairs and carnivals, amusement parks are stationary and built for long-lasting operation. They are more elaborate than city parks and playgrounds, usually providing attractions that cater to a variety of age groups. While most people assume amusement parks are an American invention, their roots are in fact grounded in the Old World. Many of Europe's best-known amusement parks are centuries old, evolving from European fairs, large picnic areas, and upper class "pleasure gardens" -- public spaces that included recreational activities in the 18th and 19th century -- to established tenants of local culture and were created for people's recreation (Adams, 1991). Realizing the role of an amusement park in leisure tourism, the Nigerian government established many of it in different parts of the country in the late 1980s (Lagos state amusement park, Polo Park in Enugu state etc. Unfortunately, these amusement parks established by the government were not very innovative, consequently, many of their facilities became obsolete. This lapse in management brought in private investors into the amusement park business in Nigeria and this led to the establishment of the first private amusement park, the Magic Land Amusement Park and Resort, which was opened on 1st of March, 2007 and also paved way to the establishment of other parks in Nigeria (Enemuo, & Obijuru, 2017). It has been said that between 270 and 335 million people visit amusement parks each year. According to the U.S. Consumer Product Safety Commission, more than 30,000 people visited emergency rooms from amusement park injuries in 2016. Combine that with the over 22 reported deaths linked to amusement park rides since 2010, and consumers may realize that a day at a theme park could cost a lot more than their ticket price (EHS Insight Resources, 2017). There is little or less information about ensuring the health and safety of both employees and customers in an amusement park, all what we see are data related to accidents and incidents that occurred in these parks. The term *incidents* refer to major accidents, injuries, deaths and significant crimes. Attraction-related incidents usually fall into one of the following categories:

- i. Negligence on the part of the park, either by ride operator or maintenance;
- ii. Caused by negligence on the part of the guest. This can be a refusal to follow specific ride safety instructions, or deliberate intent to break park rules;
- iii. The result of a guest's known, or unknown, health issues; and
- iv. Act of God or a generic accident (e.g. slipping and falling) that is not a direct result of an action on anyone's part.

There have been a handful of incidents associated with amusement parks from inception and these by law are to be reported to the regulatory authorities for further investigation. The list below is a summary of notable incidents that have taken place at various amusement parks over the years. The list is not exhaustive of all but just to give an insight into it:

- i. On 1st of April 1994, a boy was flung off the "Water Chute" ride when a steel hoop collapsed in wet and windy conditions and fell onto the open-topped carriage in which he was travelling. This happened in Coney Beach Pleasure Park, Porthcawl, Wales. The 9-year-old boy died immediately (Nowicka, 2011);

- ii. A 20-year-old woman died as a result of injuries sustained on a roller coaster when two carriages on the Twister roller coaster collided at Light Water Valley Theme Park, North Yorkshire, England on the 20th of June 2001;
- iii. On 11th of July 2016, two kids died while four sustained injuries at Oakland Amusement Park, Enugu State, Nigeria, where six children jumped out of the ride (Coffee Cup Machine) and were all hit by the rotating structure (Lawrence, 2016);
- iv. A 5-year-old girl drowned inside the pool of Coral Sea Waterworld Hotel, Sharm El-Sheikh, Egypt and was pronounced dead on the 17th of May 2013 (Phil, 2013);
- v. On the 31st of July 2019, about 44 park-goers landed on the pavement, injured and bled at the wave pool of Yulong Shuiyun Water Amusement Park, Longjing, China (Christopher, 2019); and
- vi. A rod fell from Ferris wheel, hitting a man, at the Global Village, Dubai, which resulted in his death. This happened January 24, 2013 (Ramola, 2013)

The amusement park industry which is a division in the hospitality sector has so many sections which are all prone to health and safety issues and thereby must be given attention. However, in this research work, only people who directly interact with games and rides and are liable to have injuries and accidents as they use the games are put into consideration. The aim of this research work is to provide risk mitigation best practices in recreational/amusement parks. The objectives of this work are to conduct a survey to assess current health and safety activities via the use of survey questionnaires, to identify inadequacies in the park's health and safety measures through the use of survey questionnaires and physical observations, to identify likely hazards and proffer mitigating steps via the proposition of an operational hazard analysis document, and to create a standard hazard policy. In this study, critical hazards in one of the most crucial sections of amusement parks will be identified, classified, and analysed based on Health, Safety and Environment (HSE) standards. It is against this background that this project is considered.

## MATERIALS AND METHODS

Hi-Impact Planet Amusement Park & Resort (HIP) was used as a case study. HIP is located at Ibafo in Ogun State, Nigeria. It is a subsidiary of the Solution Media and Infotech Limited (SMIL), a support service-based firm which is into rendering technical support services. The aspects selected for this research work are the attendants, operators and maintenance personnel of an amusement park.

### 2.1 Mode of Data Collection

Data was obtained via the use of various sources. Primary sources include the use of survey questionnaires to obtain data from the park's customers. A total of 126 respondents were taken into consideration. Interviews were conducted and physical observations were also done. Secondary sources of data involve published and unpublished books, journals, websites, and magazines.

### 2.2 Method of Data Analysis

Desktop Exploratory, IBM Statistics, and Microsoft Excel were all used for analysing the data from the questionnaire. For MS Excel, Excel tables were used to classify each question asked in the questionnaire while bar plots were used to visualize the data, thereby giving it a more detailed explanation. For Desktop Exploratory, Correlation analysis was used to analyse the relationships between the questions. Significance method was also used to further buttress the correlations, thereby making us see the links between causes of injuries and accidents.

## 2.3 Policies Documentation

Two main documents were formulated as policies: Operational hazard analysis document (OHA) and Safety Hazard Policy (SHP). The OHA was formulated by classifying rides and games into sections and putting contributing factors of accidents for each ride and finally stating preventive measures for each likely hazard. The SHP aims at making policies that guides the operation and maintenance of the rides and games in an amusement park.

# RESULTS AND DISCUSSION

## 3.1 Questionnaires' Responses

A total of 126 respondents participated in the study. 11 questions were asked in the questionnaire and the entire questionnaire had a 100% response rate. Both the questions and the rate of response for each question are given below:

Question 1: Select your age range (18 – 24: 22 responses, 25 – 34: 66 responses, 35 – 44: 27 responses, 45 – 54: 10 responses, 55 and above: 1 response)

Question 2: Select the region your state falls into (South-East: 16 responses, South-South: 12 responses, South-West: 86 responses, North-Central: 7 responses, North-East: 2 responses, North-West: 3 responses)

Question 3: How often do you visit an amusement park? (Once a week: 9, Once a month: 16, Once in 3 months: 14, Once in 6 months: 32, Once in a year: 55)

Question 4: On average, how many hours do you spend in an amusement park? (1 – 2: 24 responses, 3 – 4: 67 responses, 5 – 6: 27 responses, 7 – 8: 6 responses, 9 – 10: 2 responses)

Question 5: Is this your first time in an amusement park? (YES – 12, NO – 114)

Question 6: Have you had any safety concern in an amusement park? (YES – 110, NO – 16)

Question 7: Heard of any injury in the amusement park before? (YES – 60, NO – 66)

Question 8: Are there safety signs and rules shown in strategic places? (YES - 115, NO - 11)

Question 9: Adherence to safety boards' signs and rules (YES – 100, NO – 16)

Question 10: Do you follow rules and regulations when in the park? (YES – 118, NO – 8)

Question 11: Were the safety belts/straps firm enough while on the ride? (YES – 115, NO -11).

## 3.2. Analysis of Questionnaires

### 3.2.1 Use of Microsoft Excel

Analyzing the responses from each question in the questionnaire through the use of Microsoft Excel, the following can be deduced:

- i. At least each respondent visits an amusement park once in a year, irrespective of the state/region they reside;
- ii. Basically, out of 126 respondents, over 90 of them falls into the age bracket of 25 – 44years. This shows that mainly youths do visit amusement parks and they are extremely open to health and safety concerns because there will be a rush in them to have a taste of all rides and games in the park;
- iii. Out of 126 respondents, at least 94 people spends a minimum of 3 hours in the park. This is enough time for anyone to be exposed to health and safety concerns;
- iv. It also reveals that about 110 people have had a cause to report safety concerns in the park to either the health and safety department or the management. This figure is alarming;
- v. Despite the availability of safety signs and rules as indicated by majority of the respondents, 60 respondents say they have seen or heard of customers and guests who had injuries while using the rides and games. This is on the high note and should not be taken for granted; and

- vi. Lastly, despite a very high number of respondents indicated that they do obey safety rules and regulations and the safety belts being firm on them, injuries and accidents still happen in amusement parks. This is the very reason why health and safety should cover all aspects of operation (attendants, operators, rides, and games).

### 3.2.2 Use of Desktop Exploratory and IBM SPSS

Using Desktop Exploratory, a simple correlation analysis was carried out on the last seven (7) questions of the questionnaire. There are two kinds of responses (YES and NO) for each question, so a YES was assigned number one (1) while a NO was assigned number zero (0).

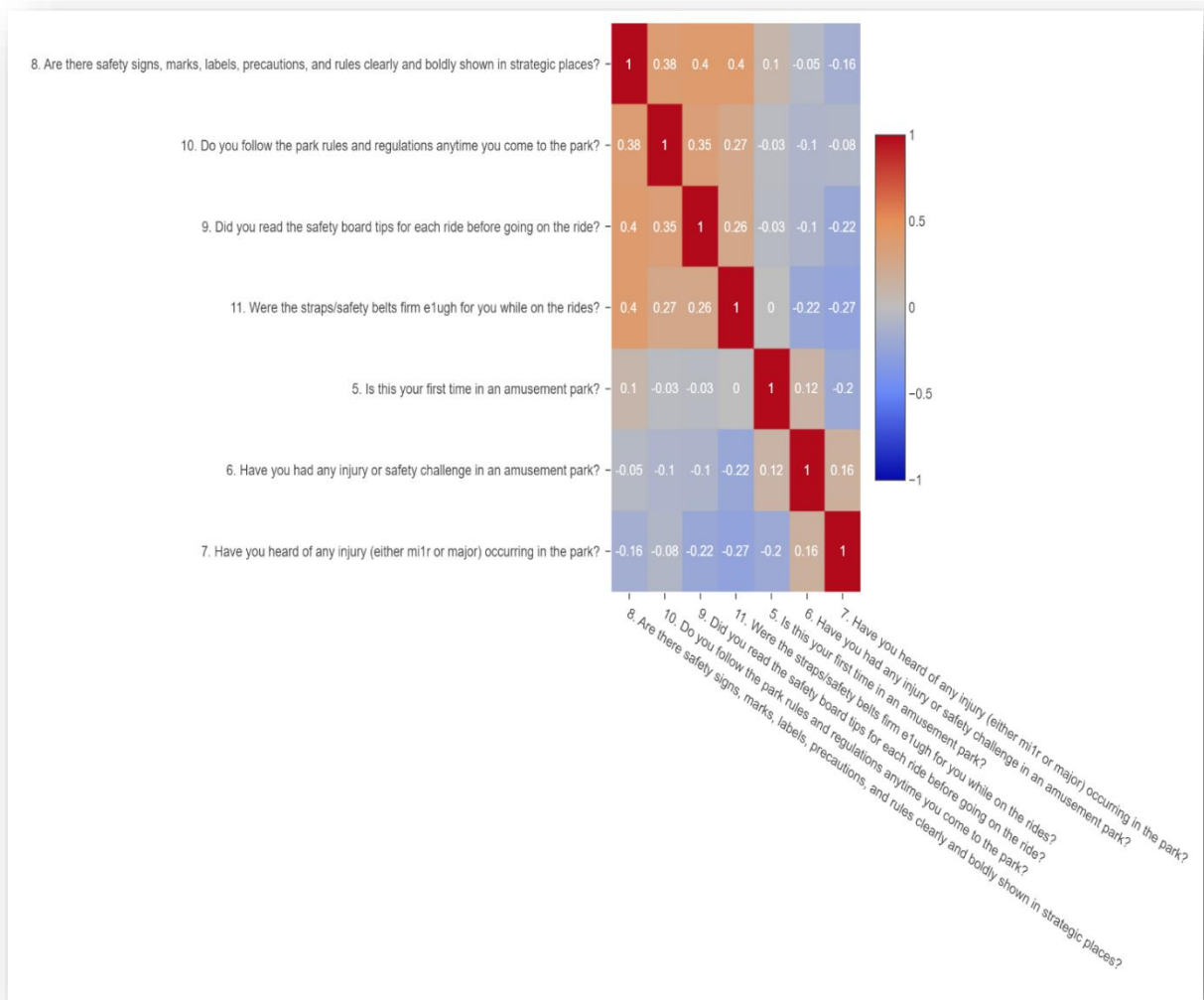


Fig. 1 A Correlation Analysis of last seven questions

The correlation analysis simply shows linear relationships between variables (questions). From the seven questions extracted for analysis, there is a moderate positive correlation (0.4) between questions 8&9 and 8&11:

Question 8: Are there safety signs, marks, labels, precautions, and rules clearly and boldly shown in strategic places?

Question 9: Did you read the safety board tips for each ride before going on the ride?

Question 11: Were the straps/safety belts firm enough for you while on the ride?

This shows that almost everyone who selected a YES for question 8 also selected a YES for questions 9 and 11, that is, there was safety signs and marks everywhere in the park and also the operators and attendants observed almost all safety measures on them. The correlation between questions 7 and 8 is a negative correlation (-0.16). This indicates that the presence of safety measures alone in the park does not eradicate injuries and accidents. Also, there is a strong negative correlation (-0.27) between questions 7 and 11. This means that the belts and straps used on customers does not necessarily eradicate injuries and accidents in the park.

### 3.3 Operational Hazards Analysis (OHA)

The OHA is a document that was formulated by taking a look at all the rides and games in the amusement park, then classifying them into categories and assigning factors that can cause accidents for each ride and finally stating preventive measures for each likely hazard. Table-1 shows the short list of a few of them.

Table-1 List of Operational Hazards Analysis

Device-Category	Device-Type	Operator-Device Collision Contributing Factors	Preventive Measures
Go-karts	Adult Go Karts	Bad tyres	Replace or inflate tyres to required pressure
		Slippery tracks	Allow tracks to dry before usage
	Skiddy Karts	Bad brakes	Adjust brakes or replace the pads
		Low battery	Charge the battery or replace with better ones
Circular Revolving Rides	Enterprise	Slippery track	Allow the tracks to dry before usage
		Bad brakes	Adjust brakes or replace the pads
		Unfastened harness	Fasten the harness
	Dream Machine	Unclosed doors	Close the doors properly
		Low hydraulic level	Top up the hydraulic to the required level
		Unfastened seat belt	Fasten the seat belts
Vertical Revolving Rides	Ferris Wheel	Loose lap bars	Readjust the lap bars
		Loose handle chains	Tighten up the handle chains
	Hoppla	Unlatched doors	Latch doors properly before usage
		Bad brakes	Adjust brakes or replace brake pads
		Wrong door positioning	Always position the doors properly for unloading passengers
		Unfastened seat belts	Fasten the seat belts
		Unlatched lap bars	Latch up the bars properly before usage

### 3.4. Safety Hazard Policy

This safety hazard policy covers the operation and maintenance cultures of an amusement park which enables a safe operation of the park. An amusement park must aspire to provide an occupational injury and illness-free environment in all ramifications of the park's operation, be it employees, customers, and third party.

This objective can only be achieved by maintaining a world-class health and safety culture that is embraced by all and that is fully supported in all levels of the organization. Below should be the commitments that world class amusement parks are meant to undertake:

- i. By operating businesses in a manner that protects the health and safety of employees, contractors, visitors and neighbours, while maintaining full compliance with applicable laws, regulations and voluntary obligations; and
- ii. By encouraging staff members to participate in the development and review of our Occupational Health & Safety programs, and consider their inputs and suggestions in decision-making processes that affect workplace health and safety.

## CONCLUSION

Due to the negligence of either the management, operators and attendants, or customers on safety in the use of rides and games in amusement parks, figures are rising on a daily basis as it relates to accidents, injuries, and near-misses in the parks. It is therefore vital that for healthy and safe park operation, the preventive measures and sustainable solutions proffered for operators and attendants to ensure safe environment for all are considered and implemented. Results of this study have confirmed that there are safety marks and signs around the park and each ride/game has its safety measures which are always adhered to by the customers but the presence of these safety measures in the park does not eradicate injuries and accidents. Listed are some of the recommendations to ensure that the safety of everyone in the park, most especially park users is achieved in amusement parks: Extensive Park's Safety Awareness, Strict Enforcement of existing legislations, Regular Visits of regulatory bodies, Compulsory Training and Retraining, and Enforcement of Penalties for defaulting Establishments.

## CONFLICT OF INTEREST

There is no conflict of interest for this research work.

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