



Improving Operational Safety of Recreational Parks Through Safety Risk Assessment

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Abstract: Different industries come with different accidents and incidences. The hospitality sector is not left out of this and in spite of efforts geared towards ensuring zero records of casualties, recreational parks in this sector still has a record of incidences that is fast becoming worrisome and a major concern to all, especially the management of such parks. In this study, the safety measures of an amusement park 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 and carefully analysed the data collected. Here, out of 126 respondents, 75% spends a minimum of 3 hours in the park. Also, it reveals that about 87% have had a cause to report safety concerns in the park. Despite the availability of safety signs and rules as indicated by majority of the respondents, 48% reported about customers who had injuries while using the rides and games. A standard hazard policy was also formulated, which consists of safety guidelines for both operations of the park and maintenance of rides and games.

Keywords: Health and Safety, Amusement Park, Accidents, Rides and Games, Operational Guidelines.

INTRODUCTION

Hi-Impact Planet Amusement Park and Resort (HIP) as a case study is located in the western part of Nigeria. It is a subsidiary of Solution Media and Infotech Limited (SMIL), a technical support service firm involved in rendering support services to the entertainment and media industry. The park consists of several rides and games, totalling to about 40 indoor and outdoor rides. Tourism plays a very important part in the world economy today and it is a dynamic, evolving consumer driven force and the world's largest industry, if all its inter-related components are placed under one umbrella (Walker, 2007). These components include travel/transportation, hospitality, lodging/accommodation, conventions, expositions, meetings and events, restaurants, managed services, recreation and attractions. The economic importance of the tourism industry cannot be overemphasized. Recreation and attractions, according to Swarbrooke (1995), can be divided into four main types: Natural features (beaches, caves, forests), Man-made building, structures and sites that originally designed for a purpose other than attracting visitors (churches, archaeological sites), Man-made building, structures and sites that are purpose-built to attract visitors and cater for their needs (Museums, amusement parks), and special event.

According to the above division, amusement or theme parks are man-made attractions, built with an aim to attract visitors/tourists and cater for and satisfy their needs. An amusement park according to the Collins English dictionary is a group of entertainment attraction, rides and other events in a location for the enjoyment of large numbers of people. During the last 20 years, there has been a growth in large amusement parks with ever more extreme rides. There are now rides with speeds of over 170km/hr and those with falls of over 100 meters. Estimates by Euro parks suggest that a total of 225 leisure parks within the European Union attract nearly 200 million visitors annually with a turnover in excess of two billion euros (Carolyn *et al.*, 2005). 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. These rides and games pose a whole lot of risk to users because data shows that amusement ride injuries and accidents are on the rise. The story is told of two kids who died while riding the 'coffee cup machine' in Oakland Amusement Park, Enugu, Enugu State, Nigeria (Lawrence, 2016). This and many more are incidences of injuries and accidents that occur in recreation parks around the world and the time is now for a very comprehensive work to be done which should address all aspects of operation and maintenance in the amusement park sector.

According to literature available on health and safety in amusement parks, Woodcock (2014) reported an analysis on the amusement injury data collected by the national electronic injury surveillance system (NEISS) for 2010 in the United States of America. It was recorded that Inflatable slides and bounces were involved with a large share of amusement injuries. Kassler (2017) focused on the safety of employers, employees and the general public using fairgrounds and amusement parks. It was found that amusement parks are basically being found wanting of adequate health and safety measures. Avery & Dickson (2010) analysed the dimensions and practices that have shaped the safety of amusement rides and devices in the US amusement park industry. It was concluded that continued amusement ride and device incidents resulted from a lack of nationally accepted and recognized standards which potentially led and will lead to negative guest perception. Woodcock (2019) compiled accidents involving amusement rides for a year and analysed them based on event type, ride type, operation type, and regional location. Rajendran *et al.*, (2019) identified work hazards and basic hierarchical strategic model to overcome hazards. They found out that here is a huge jump in the number of occupational injuries despite various legal reforms being introduced. Previous works in the general health and safety at work sector includes: Aras (2013); Iavicoli *et al.*, (2006); Denisova (2017); Cunningham (2020); La-garcia *et al.*, (2020); Okuma *et al.*, 2020; Rezamohandes & Zhang (2020); Torrecilla (2021); Mohandes (2021); and Omoyi, & Omotehinse (2022). This paper focuses on conducting a survey to assess current health and safety activities of an amusement park via the use of survey questionnaires, to identify inadequacies in the park's health and safety measures, and to create a standard hazard policy which will proffer likely mitigating measures.

MATERIALS AND METHODS

The methodology adopted to conduct the research and to report effectively on the procedure, it is structured using statistical design that comprise quantitative and qualitative kind of approach

2.1 Mode of Data Collection

This is a research design where the primary method of data collection is by survey and observations. A total number of 126 respondents were used as the sampling size and a questionnaire of 11 questions were administered.

The people that pay the park visits are majorly people from the neighbouring states like Lagos and Oyo States. For Observations, the amusement park was generally observed by taking a walk round. The operation was carefully noticed and the games & rides were also physically looked at thoroughly. Secondary sources of data collection include information from past record books of the company, journals, websites, and unpublished and published research work.

2.2 Method of Data Analysis

Microsoft Excel was used for analysing the data from questionnaire. Response was recorded in frequency table. From the questionnaires, current health and safety activities of a park were evaluated and inadequacies were highlighted. Lastly, a hazard policy was set up based on the operations of the amusement park.

RESULTS AND DISCUSSION

3.1 Analysis of Questionnaires

Tables-1-11 shows the results obtained from the questionnaires administered.

Table-1 Count of respondents' age range

Age	Count	Percentage (%)
18 - 24	22	17.5
25 - 34	66	52.4
35 - 44	27	21.4
45 - 54	10	7.9
55 and above	1	0.8

Table-2 Region of respondents

Region	Respondents	Percentage (%)
South-East	16	12.7
South-South	12	9.5
South-West	86	68.3
North-Central	7	5.6
North-East	2	1.6
North-West	3	2.4

Table-3 Attendance of respondents in the amusement park

Amusement Park Visits	Respondents	Percentage (%)
Once a week	9	7.1
Once a month	16	12.7
Once in 3 months	14	11.1
Once in 6 months	32	25.4
Once in a year	55	43.7

Table-4 Time spent in the amusement park on average

Numbers of hours in the park	Respondents	Percentage (%)
1 - 2	24	19
3 - 4	67	53.2
5 - 6	27	21.4
7 - 8	6	4.8
9 - 10	2	1.6

Table-5 Respondents' first timeliness in the amusement park

First Time in an Amusement Park	Respondents	Percentage (%)
Yes	12	9.5
No	114	90.5

Table-6 Indication of safety issues

Had any safety concern before?	Respondents	Percentage (%)
Yes	110	87.3
No	16	12.7

Table-7 Presence of Injuries in the park

Heard of any injury in the amusement park?	Respondents	Percentage (%)
Yes	60	47.6
No	66	52.4

Table-8 Presence of safety signs and rules in the park

Inscription of safety signs and rules	Respondents	Percentage (%)
Yes	115	91.3
No	11	8.7

Table-9 Respondents' adherence to safety signs

Adherence to safety rules	Respondents	Percentage (%)
Yes	100	79.4
No	16	20.6

Table-10 Adherence to rules and regulations

Adherence to park rules	Respondents	Percentage (%)
Yes	118	93.7
No	8	6.3

Table-11 Response to firmness of safety belts, hooks, and straps

Firmness of safety belts while on the ride	Respondents	Percentage (%)
Yes	115	91.3
No	11	8.7

From the analysis of the questionnaires, 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 75% 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 87% 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, 48% says 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 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;

A. Safety Guidelines for Operation

The safety policies guiding the operation of amusement rides and games are as follows;

- i. The amusement ride shall at all times be in immediate control of an amusement ride operator when it is available for use to members of the public. In addition, the minimum number of ride attendants needed to operate the device safely shall be on duty at all times the ride is operating;
- ii. During operation, an amusement ride operator shall not be in charge of more than one ride at any one time, and shall be in control throughout the ride cycle of the device;
- iii. The operator of an amusement ride shall be provided with effective means of communicating any necessary instructions to members of the public using the ride, where necessary;
- iv. The amusement ride operator shall ensure that guards and safety measures provided for the ride are maintained in position whenever the ride is in motion or in use;
- v. Where there is a particular requirement to load passengers into the device in a particular pattern, the operation should be done in such a way that there is a safe and correct loading of guests; and
- vi. All entrances and exits should be closed off before operation commence.

B. New Areas Identified for Safety Policies

The following policies were identified during careful study of questionnaires as policies for some sections;

- i. Mandatory study of safety boards by guests (no one should be allowed on the ride without careful study of the board);
- ii. Mandatory health and safety personnel visits to games area;
- iii. Compulsory training and retraining of operators and attendants;

- iv. Enforcement of penalties for defaulting operators; and
- v. Submission of distracting gadgets.

C. Safety Guidelines for Maintenance

The safety policies guiding the maintenance of amusement rides and games are listed below;

- i. All replacements, repairs and modifications of amusement rides and devices, including discrete systems and components within them, shall be carried out by authorised persons;
- ii. In the absence of instructions from the designer or manufacturer, those authorised persons involved in the maintenance, replacement, repair and inspection of amusement rides and devices should be able to demonstrate knowledge of the original intentions of the designer or manufacturer;
- iii. The frequencies at which servicing shall be carried out shall be in compliance with the manufacturer's recommendations;
- iv. Servicing recommendations shall deal with all components that have to be checked, tested, lubricated, adjusted or replaced at specified intervals;
- v. Preventive maintenance programmes and inspection routines shall be implemented for the moving and load-bearing components and structural members of an amusement device, to maintain mechanical and structural integrity;
- vi. Any inspection procedure and schedule specified by the designer or manufacturer shall be implemented and recorded in the technical file; and
- vi. Every amusement device in use, together with all its ancillary parts, shall be thoroughly inspected (visual examination also included) at appropriate intervals.

The below covers visual inspection only;

D. Visual Inspection

- i. Structural members should be examined for deterioration, such as rusting of steel, rotting of wood/plywood, degradation of textile membranes;
- ii. Passenger restraint devices should be closely examined for wear, correct adjustment, correct operation and anchorage;
- iii. Critical welds, bolts, pins, joints, should be closely examined for evidence of crack or excessive wear;
- iv. Visual inspection of weld joints is particularly relevant where welds are being examined for the first time after modification or repair; and
- v. Electrical and electronic installations should be examined for any modifications or deterioration.

E. Hazard Prevention

Preventive and protective measures against hazards to workers' safety and health should be implemented in the following order of priority;

- a. Eliminate the hazard/risk;
- b. Substitute with less dangerous sources of risk;
- c. Control the hazard/risk at its source through the use of engineering controls or organisational measures;
- d. Minimise the hazard/risk through the design of safe work systems, which include administrative control measures; and
- e. Where residual hazards/risks cannot be controlled by collective measures, the employer should provide appropriate personal protective equipment, including clothing, at no cost, and should implement measures to ensure its use and maintenance.

CONCLUSION

The history of shut downs of amusement parks due to accidents and injuries have always been because either an operator is not doing his/her job well (for instance, forgetting to fully tighten a belt around a customer's waist) or the ride malfunctioned during operation. This study shows preventive measures that can be taken into practice on the rides and games. It comes up with a safety hazard policy. The application of these measures will definitely reduce accidents and injuries to the barest minimum if taken into consideration. Lastly, the present study revealed that there is a dire need to focus on health and safety of customers in the parks while not neglecting that of the operators and attendants, which helps in reducing law suits, shut downs, and bad reputation.

CONFLICT OF INTEREST

There is no conflict of interest for this research work.

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