

# Railway Security Systems in the Republic of South Africa to Improve Passenger Safety



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## Abbreviations and Acronyms

ACSA	Airports Company South Africa
APS	Autotransformer Paralleling Substations
BMC	Bombela Maintenance Company
BOC	Bombela Operating Company
CCTV	Closed Circuit Television
CoJ	City of Johannesburg
CoT	City of Tshwane

DOT	Department of Transport
EMM	Ekurhuleni Metropolitan Municipality
FY	Financial Year
GAO	Government Accountability Office
MOU	Memorandum of Understanding
MPD	Metropolitan Police Departments
OCD	Operating Commencement Date
OSD	Operator Security Division
PRASA	Passenger Rail Agency of South Africa
SA	South Africa
SAMS	Security and Access Control Management System
SANS	South African National Standard
SAPS	South African Police service
RRP	Rapid Rail Police
SAS	Security Analysis System
SLA	Service Level Agreement.
SMS	Safety Management System
SMSR	Safety Management System Report
SSO	Security Systems Officer
TFR	Transnet Freight Rail
TSA	Transportation Security Administration

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## Definitions and Interpretations

Closed System	means that the railway infrastructure (e.g., track, train control, signalling systems such as relay rooms, electrical systems such as substations, railway stations, relay rooms, etc.) is build and/or surrounded by a form of barricade with access control to gain access into the railway system such as fences, gates, walls, access controls, etc. It is a closed system that have restrictions and is monitored or controlled on who enters or leaves the system. Thus, any unauthorised entry is regarded as trespassing.
Open System	means that the railway infrastructure (e.g., track, train control, signalling systems such as relay rooms, electrical systems such as substations, railway stations, relay rooms, etc.) is not build and/or not surrounded by a form of barricade with access control to gain access into the railway system. It is an open system that do not have restrictions and is not monitored or controlled on who enters or leaves the system. Thus, it is accessible by any person (s).

## **Executive Summary**

The research paper explores security systems utilised within the passenger railway system in South Africa (SA) to improve passenger safety. The railway system by design has multiple access points leaving the system vulnerable to criminal activities such as theft, vandalism, robbery, assault, and sabotage. Security is a major factor for people when selecting a mode of public transport for a journey on a daily basis. South African railways comprise urban and long-distance commuter public passenger rail transport operated by Passenger Rail Agency of South Africa (PRASA), Transnet Freight Rail (TFR), Bombela Operating company (BOC) and other private tourism and heritage operators.

The security systems deployed at PRASA, BOC and TFR are largely similar (Security personnel at stations and in trains, CCTV, walling, patrols) but there is a wide gap between incidences at PRASA and BOC. The management and implementation of security plans at BOC is more effective than at PRASA as evidenced by management commitment of resources towards security and safety and the relatively low number of recorded security incidences.

The qualitative data collection process included the collection and analysis of security strategy information and data submitted to the Regulator, the collection of security incident reports compiled by PRASA and Gautrain (BOC), the review of Corrective Action Plans developed by PRASA and Gautrain (BOC) and information gathering from articles, journals and books regarding security systems and passenger safety in relation to security incidents. The quantitative data collection approach included conducting meetings with relevant PRASA and Gautrain (BOC) employees to gather insights on security systems currently implemented as well as how effective the security systems are.

The research revealed that the most vulnerable place in the railway system affecting commuter safety is at the train stations because they accommodate large numbers of people at any given time.

Findings show that the security management system within PRASA requires improvement. For effective management of security and safety, PRASA should develop and implement more robust risk management techniques to improve passenger safety to promote the use of rail by urban commuters and long distance passengers. Security incidents have a huge impact on service delivery. Theft and vandalism of the railway infrastructure disables the railway system leading to unsafe and unreliable services. Train commuters have lost jobs due to trains running late as a result of security mismanagement as some could not afford the relatively expensive alternative modes of transport. In the interest of the economy of the country and welfare of people, it is recommended that rail transport operators in SA continuously develop and review their security management strategies to enhance passenger safety.

To improve passenger security, the railway operators need to continually conduct risk assessments of their environment, update absolute security systems, carry out research on latest trends in railway security management and benchmark against best practises.



## 1 INTRODUCTION

Railways have been a means of commercial transportation for passengers in SA since 1859 (Talbot, 2007). Communities across SA rely on reliable, safe, and secure rail systems. South Africa (SA) has three (3) major passenger rail transport operating companies, namely PRASA's Metrorail/urban trains and Shosholoza Meyl for long distance, TFR's Blue Train, BOC operating as Gautrain and other small tourist and heritage passenger operators scattered throughout the country. Each weekday, more than 2 million passengers are utilising public passenger rail transport in SA. Railway systems in SA are not entirely closed systems (except in some of the train station with barriers such as fences, gates, access controls and walls) leaving the transportation systems open to theft, vandalism, robbery and assault compromising passenger security.

The openness of passenger rail system leaves the system vulnerable because railway operators are not always able to fully monitor or control who trespasses the railway system. This results in social and economic challenges in the country. Reliable, affordable and safe public transport is key in the development of the country as most people stay long distances away from their jobs.

This study focuses on railway security systems in SA to improve passenger safety since incidents of theft, vandalism, sabotage, and antisocial behaviour create delays and disruptions within train operations and have an impact of passenger safety. Unreliable rail transport harms the image of rail public transport, preventing those who mostly rely on it for economic opportunities from using it, alternatively preventing those falling under the low-income class not to make it to work on time and sometimes losing the entire workday. This may lead dismissals and resignations by the low-income commuters from their workplaces due to unaffordability of taxi, bus fares and other modes of transport (this has a negative impact on all rail users including learners and job seekers).

There is a need to secure railway systems more effectively. Stakeholders for railway passenger safety include railway network owners, railways operators, DoT, RSR, SAPS, etc. Therefore, the targeted audience for this research study are researchers and decision makers in the identifiable role players and stakeholders as well as advanced graduate students in research fields, security managers, law enforcement, railway operators and technology providers interested in critical infrastructure protection to improve passenger safety.

## **2 PURPOSE OF THE STUDY**

The aim of the research paper is to evaluate security systems deployed at PRASA and BOC and their effectiveness to enhance passenger safety. In this context, a significant part of the research is dedicated to the review of studies in railway systems vulnerability, security incidents that were reported to the RSR from financial year 2014/15 to financial 2021/22 and the effectiveness of deployed security systems in improving passenger safety. This research paper's objective is to observe, analyse security challenges, where applicable provide recommendations for the identified security needs and improvements of passenger safety. The following security categories are recognised by the RSR (SANS 3000 1-2016) to ensure that the RSR's mandate is achieved:

- Category 1: Theft of assets
- Category 2: Malicious damage (vandalism) to property
- Category 3: Threats
- Category 4: Hijacking of trains
- Category 5: Crowd-related incidents
- Category 6: Industrial action
- Category 7: Personal safety on trains
- Category 8: Personal safety on stations
- Category 9: Personal safety outside station platform areas
- Category 10: Body of dead person dumped within the railway reserve

This research study is limited to category 1, 2, 7, 8 and 9. The main aim will be to highlight gaps and recommend possible improvement areas in South African passenger railway systems to promote a proactive security management by operators.

### **3 LITERATURE REVIEW**

The main purpose of the literature review was to investigate matters regarding security in the railway systems within public passenger transportation. The literature review discloses that the railway network has been in existence before the rise of most of the security and safety challenges emerging on a yearly basis and impacting negatively on quality of train services.

Most countries are now dependent on railways for the mass movement of people especially in urban areas. In the literature, the concepts of perceived safety and security have been studied in the sphere of the assessment of the quality of public transport, particularly in the urban context where there are choices of transport modes that include buses, cars, taxis and trains. The literature suggests that the choice of a mode of transport is largely determined by how passengers perceive safety and security of the mode of transport (Coppolaa & Silvestri, 2020).

In their reviews of the literature, (Redman et al., 2013; Hansson et al., 2019; van Lierop et al., 2018) have shown that perceived quality of public transportation service has been measured based on reliability, speed, frequency, punctuality, regularity, safety, security, information, and customer service, whereas perceived quality of public transport terminals and vehicles is assessed in terms of cleanliness, safety, security, staff, and comfort.

Most of the railway systems are/were not built with intensive antivandal railway sub-systems that deter or prevent theft, vandalism and sabotage challenges faced by the rail industry. Major cities in SA are connected by Railway lines. The South Africa railway system is the most highly developed in Africa. The first passenger railway was from Cape town to Wellington in 1859. However, the first passenger carrying services was built by the natal Railway Company, linking to Durban with harbour point, opened on the 26th of June 1860. (Talbot, 2007).

## **3.1 SECURITY AND SAFETY**

### **3.1.1 Security**

According to D'Amore and Tedesco (2015), security is often the first thing in a traveller's mind when deciding on the mode of public transport and safety needs to be considered, since for many people the fundamental freedom to come and go as they please is underpinned by the ability to use public transport. The protection of train and railway infrastructure system is a challenging aspect and has been broadly attempted to be resolved in the past years by experts from various fields.

Pietre and Chaudet (2010) stated that safety is the relative freedom from danger, risk or threat, injury or loss of personnel and property as a result of an act caused intentionally or by an accident. Pietre and Chaudet (2010) defined security as a prevention and protection against assault, damage, fraud, invasion of privacy, theft, unlawful entry and other such occurrences caused by deliberate action. According to Kubas et al. (2017), security is a basic need necessary to be addressed in all areas of life. Whereas Matsika et al. (2013) explained that security is the process of mitigating the effects of intentional attacks on the system and safety as the proofs of mitigating the effect of unintentional failures in the system. Security and safety within the public transportation perspective may be regarded as when there is the risk in encountering crime that commuters in general have difficulty in adopting external risks in their judgements in an objective way (Borjesson, 2012).

### **3.1.2 Passenger Safety**

Rundmo, et al (2011) found that preventing any unexpected event (injuries, theft and others) comes from personal responsibility. By taking responsibility on other commutes, accidents can generally be prevented. The traveller's play the main role in encouraging people to behave in safe manner. Rundmo, et al (2011) found that the travellers' feel uncomfortable when the public transport are too crowded. Everyone needs to put an effort to take care of their own safety. Everyone in society portrays different behaviours. Indeed, the passenger's behaviour is important to increase good perceptions among public transport users. Having a good knowledge safety in public transport can eventually increase positive travellers' behaviour and make other people feel

safe. The work further concluded that rules should be implemented in public transport to shape a more disciplined and positively behaved travellers.

## **3.2 RAILWAY SYSTEMS**

Passenger rail systems, which include urban and long-distance routes are difficult to secure. Critical challenges facing the rail system operators is finding ways to protect railway systems from potential theft, vandalism and sabotage without inconveniencing commuters and the efficiency of rail travel (GAO, 2007).

### **3.2.1 Trains**

Railway systems that are interconnected and that play a vital role within train operations are categorised as “safety critical” if they can cause great damage to persons or property. These systems comprise of, but are not limited to communications, doors, environment, brakes, propulsion, power distribution and lighting. For example, the doors in a passenger train are connected to, and directly influence the braking of a train. Some of the security systems, such as doors, lighting and environment are associated with passenger service, even though they are also applicable to a lesser extent in freight systems (Calson et al., 2003).

Communications and signalling are critical systems for train operations in an environment that needs to take passengers safety as a priority. It is the duty of the engineers and train crews to know what is ahead of the train to guide the train and ensure that they act accordingly through communications should there be elements of theft, vandalism, sabotage that could put passenger safety into danger. Topographical features, as well as train routing, may make it impossible to see far ahead to avoid collisions or to see if there are railway infrastructure components missing due to theft. Good communications (could be from the train control centres), signalling, and routing allow crews to react to changing condition to avoid collisions, accidents, and other hazards due to theft, vandalism, and sabotage of the railway infrastructure system (Calson et al., 2003).

The system that has an impact on train movement and is often not recognised are train doors. Train doors allow passengers to enter and exit a train when appropriate. Opening or closing of the

doors at the wrong time may allow passengers to enter, exit or fall from the train. Closing of the train doors at the wrong time may also result in passengers being trapped and resulting in injury or fatal injury. This is where communication systems at the station are vital. Hence train doors are closely connected to the brakes to ensure that the train cannot move when the doors are open. When train doors are connected to the brakes, the train door system becomes a particular interest to an intruder attempting to prevent train movement (Calson et al., 2003).

Calson et al. (2003) further explained that the momentum of the train and the control of speed is also a critical system where the velocity of a train must match the railway infrastructure conditions if the train is to stay on the tracks. Movement of trains must not be permitted if it is inappropriate since the effects of such movement may result in train collisions, derailment, or striking objects in the path of the train which have consequences to passenger safety.

### **3.2.2 Stations**

Railway stations accommodated many people at various times such as pick and off pick hours thus, it plays a complex role. The safety of train stations may be affected by several internal and external factors. Train stations may be classified as soft targets within the railway system since it is expected to accommodate many people from various areas (Jankura, 2021). The reason for classifying train stations as a “Soft target” is because it can be identified as a place with high concentration of people and a low degree of security against theft, crime, vandalism and sabotage, which may create an attractive target, especially for stations where the infrastructure is not adequately secured because they serve a large number of people (Jankura, 2021).

Prevention and preparedness of risks identified in train stations is vital and it requires a proper analysis of the vulnerabilities of the station assets, a clear awareness of criticalities and an adequate method to design and optimise the protection at the stations. A study was conducted in London, Paris and Brussels train stations to differentiate between objective security (video protection, specialist uniformed staff, technical monitoring systems, etc.) and feelings of security (cleanliness and sociability of facilities, customer service staff in the company, etc.). The findings highlighted aspects such as defining what a secured place is as defined by commuters. Commuters defined a secured place as a place where nothing could happen for example, military

bases and embassies where the coordinated deployment of technical and human resources to protect and monitor on a massive scale (with all the associated constraints) rendered any security breach ineffective.

Commuters further mentioned that other places where they could feel secured are their homes, holiday destinations and places where no specific external constraints are in place but where they did not imagine anything could happen to them. According to the findings of this study, none of the commuters mentioned that train stations are a secured place. The study concluded that railway companies should consider both, the level of security and feeling of security, and consequently engage with commuters to have an insight of their acceptable priorities. In addition, the study further elaborated that no security policy can survive if the measures it provides for are not accepted by commuters. The effectiveness of security policies within railway operators will be improved if the travelling public plays an active part in ensuring security. Thus, remaining vigilant, reporting unusual situations and unattended objects around or near or at the train stations is paramount (D'Amore and Tedesco, 2015).

### **3.2.3 Infrastructure**

The railway line infrastructure is designed to be in an open area and have no barriers or fences or walls throughout the entire rail network (except for areas around train station). The openness of railway line leaves the infrastructure vulnerable since operators cannot entirely monitor or control who enters or leaves (trespasses) the railway systems. The rail infrastructure's expensive assets (valuable), economic importance, and location (covering large areas or tourist destinations) makes the rail infrastructure attractive targets for theft, vandalism, sabotage and terrorism due to the potential economic damage and service disruption it causes (GAO, 2007).

In addition, the large area coverage of the rail network makes passenger rail systems difficult to secure. The study indicated that to strengthen passenger rail security, railway operators must take actions and issue security directives, testing security technologies and issue proposed rule for passenger rail security with their respective rail security roles and responsibilities (GAO, 2007).

### **3.3 RISK MANAGEMENT IN RAILWAY SYSTEMS**

Risk management is defined as a tool for informing policy makers' decisions about assessing risks, allocating resources, and taking actions under conditions of uncertainty. It was previously reported that a risk management approach can help to prioritize and focus the programmes designed to reduce criminal activities in the railway systems. Risk management, as applied in the security context, can assist decision makers to determine where and how to invest limited resources within and among the various places of the railway systems. Risk assessment is a qualitative and/or quantitative determination of the likelihood of an adverse event occurring and the severity, or impact, of its consequences. Risk assessment in security application often involves assessing three key elements—threat, vulnerability, and criticality or consequence (GAO, 2007).

Securing railway systems is a difficult task, this requires railway operators to develop a comprehensive communicated strategy, including goals and objectives for strengthening the security of railway systems. As part of that strategy, it is also critical to assess the risks facing railway systems so that limited resources and security efforts can be prioritised to the areas of greatest need such as train stations and railway lines. The responsibility for securing railway systems must be shared between railway operators, railway network owners, state, local governments and the private sectors. It is critical that the government develop partnerships and coordinate its security efforts with transportation industry stakeholders (GAO, 2007).

### **3.4 SECURITY COST**

Business cost includes all the cost as follows; fixed, variable, direct and indirect. These are cost incurred in carrying out the operations of the business including all payments and contractual obligations. The cost also includes cost of repairing or replacing or installing or upgrading assets that were stolen or vandalised. It is difficult to assess the efficiency of security measures, impossible to establish a direct mathematical link between the cost spent and the outcome in terms of the number of offences committed, culprits arrested, etc. It is also difficult to measure the real cost of security, beyond the cost of the staff and infrastructure directly allocated to this task (D'Amore and Tedesco, 2015). Multiple access points along extended routes of the railway network results in the cost of securing each location of the railway system unaffordable (GAO,



2007). D'Amore and Tedesco (2015), added that it is difficult to measure the effect of prevention policies, the goal of which is to avoid malicious acts being committed.

### **3.5 SECURITY/PROTECTION STAFF**

The presence of uniformed security guards at the station and on the train provides a form of satisfaction to commuters in terms of safety. The presence of uniformed security guards also gives an indication of law enforcement and order within the vicinity of the station, train and on the railway line. The importance of having uniformed security guards enhances security awareness (Collins (1993). The conceptual study of crime prevention encourages the railway operators to have visible foot patrols as well as conducting regular maintenance and repairs. This is because the concept was found to be effective in reducing the rate of occurrences of theft, vandalism and sabotage, and fear of crime within passenger railways (Sullivan, 1996).

Iseki and Tarlor (2010) recognised that the number of crimes (theft, vandalism and sabotage) in railway systems would be relatively low, if the presence of security guards is reasonably sufficient in terms of security guards deployed at the train stations. However, the lack of security guards and enforcement staff at the train stations will encourage people not to follow the rules even when the posters about taking precautions and safety are everywhere (Bachok et al., 2014). Indeed, without sufficient presence of security guards at the train stations will potentially allow criminals to commit crime (Advancing Public Transport, 2014).

### **3.6 BACKGROUND OF PASSANGER RAILWAYS IN THE RSA**

Rail transport in SA is an important element of the country's transport infrastructure and economy. Major cities are connected by rail, and SA's railway system is the most highly developed in Africa (ICOMOS, 2002). South Africa (SA) have three (3) major passenger rail transport operating companies namely PRASA, TFR, BOC (on a contractual bases) and a variety of small operators throughout the country. The railway existed from 1859 in SA (Talbot, 2007). Figure 1 shows the railway network that existed in the 1800s. Therefore, the emerging criminal threats found most of the railway systems with obsolete systems vulnerable to theft, vandalism and sabotage threat to security.

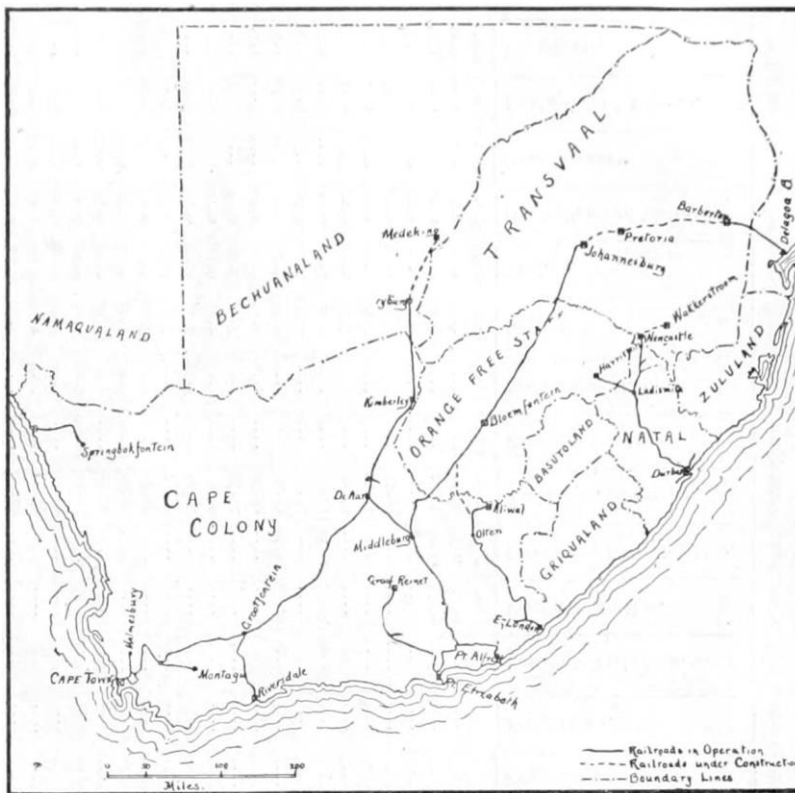


Figure 1: Rail network in 1892 (Unknown Author, 2007)

### 3.7 INTERNATIONAL RAIL SECURITY

It has been realised, within the railway environment, that the role played by the private security firms, cannot be underestimated. The private security firms form part of the core strategy of the Metrorail operations and are utilised in other railway network under TFR for security measures. The security industry is regulated through Private Security Industry Regulation Authority (PSIRA) to ensure that it can integrate private security operations within the control of the State security apparatus (Maluleka, 2010).

The following measures are taken by the Indian Railways in coordination with Government Railway Police to ensure safety and security of passengers:

- On vulnerable and identified routes/sections, trains are escorted by Railway Protection Force daily in addition to trains escorted by Government Railway Police of different States daily.

- Through various social media platforms viz. Twitter, Facebook, etc., Railways are in regular touch with passengers to enhance security and to address their security concern.
- Frequent announcements are made through Public Address System to educate passengers to take precautions against theft, snatching, drugging etc.
- An Integrated Security System (ISS) consisting of surveillance of vulnerable stations through Close Circuit Television (CCTV) Network, Access Control etc. has been sanctioned to improve surveillance mechanism over 202 railway stations.
- Fixed CCTV Cameras have been provided in 2688 coaches and 627 Railway stations for enhancing security of passengers.

According to Jacyna et al. (2017) an effective protective security regime must take account of the prevailing threat and likelihood of a security incident, the vulnerability of potential targets and the potential consequences of an attack. A lot of crime takes place at the train stations; thus, passengers are vulnerable and exposed to several security risks. Technology has had an impact on the security of trains because it helps in identifying the individuals who make the violation but cannot control them on the spot.

## **4 STAKEHOLDERS OF PASSENGER RAILWAYS IN SA**

The railway system consists of various stakeholders in SA. The responsibility for securing railway systems is shared between railway network operators, railway network owners, railway train operators, state, local governments (RSR, SAPS, DoT, etc.), municipalities and the private sectors. It is therefore critical for all stakeholders to work together in securing SA's economy.

### **4.1 DEPARTMENT OF TRANSPORT (DOT)**

The Republic of SA, through the Department of Transport (DoT) division is responsible for regulating transportation sectors such as road, rail, maritime and air (DoT, 2015). The responsibilities of the DoT regarding the rail industry comprise:

- Research, formulating legislation and policy for the development of sustainable rail transport,
- Assigning responsibilities to the 12 public entities that report to the Minister of Transport and other levels of government, and
- Rail economic and safety regulation through standards, infrastructure development strategies, and systems that reduce system costs and improve customer services.

### **4.2 RAILWAY SAFETY REGULATOR (RSR)**

National Railway Safety Regulator Act No 16. of 2002 (2009) as amended provides for the establishment of a national regulatory framework for South Africa (hereafter referred to as Act 16) and as a result the RSR was established. Before the establishment of the RSR, the railway environment was self-regulated from the inception of railways in South Africa. The RSR was established due to the acknowledgment by the State that railways are key to sustained economic growth and that safety play vital role in advancing operational efficiency of South Africa's railways (RSR, 2011a).

### **4.3 PASSENGER RAIL AGENCY OF SOUTH AFRICA (PRASA)**

PRASA is a national government business enterprise that reports to the Minister of Transport and is owned by the South African Government (Passenger Rail Agency South Africa [PRASA], 2013). PRASA is responsible for operating Metrorail as urban commuter public rail transport service that is currently operating in Gauteng, Western Cape, Kwazulu-Natal and Eastern cape with approximately 2 million passengers daily (records before the COVID19 pandemic effects) and is also operating Shosholoza Meyl for long distance routes covering the major routes in SA namely: Johannesburg, Cape Town, Durban, Port Elizabeth, Musina and East London (however the services have been suspended after a train collision that occurred on the 12th of February 2022 (news24, 2022).

### **4.4 BOMBELA OPERATING COMPANY (BOC)/GAUTRAIN**

SA has a modern urban commuter passenger train service that started its service in 2010 (in support of the 2010 Soccer world cup) called Gautrain. Gautrain is operated by BOC through a 20-year contract that commenced in 2010 and it is maintained by Bombela Maintenance Company (BMC). Gautrain operates in Gauteng province only through the following stations: Johannesburg Park station, Rosebank, Sandton, Marlboro, Midrand, Centurion, Pretoria, Hatfield, Rhodesfield and OR Tambo International Airport (Ndobe et al., 2022).

### **4.5 TFR**

TFR owns most of the rail network across South Africa that connects with other rail networks in the sub-Saharan region, with its rail infrastructure representing approximately 80% of Africa's total. The Blue Train is another public passenger railway transport in SA and it is operated by TFR. The Blue Trans is a luxurious passenger train and a popular tourist attraction. The Blue Train's services run between Cape Town to Pretoria. Based on the demand, the Blue Train traverse to Maputo through the TFR rail network from Pretoria to Komatipoort.

However, the Blue Train services were suspended in 14 February 2022 to allow the organisation to assess the impact of the occurrences that occurred in 2021 and early 2022. The suspension of

the Blue Train services was due to a runaway occurrence on 06 November 2021 at Union station, Wadeville, followed by a shunt derailment on 16 January 2022 and a coach catching fire on 08 February 2022 while the Blue Train was in for refurbishment in the Koedoespoort depot. TFR applied for a “No objection” from the RSR to resume the Blue Train services in September 2022. (MWC1187, 2022).

## **4.6 OTHER INTERFACING STAKEHOLDERS OF PASSENGER RAILWAYS IN SA**

### **4.6.1 South African Police Services (SAPS)**

According to SAPS (2009(a):13), the mandate of the SAPS Rapid Rail Police (RRP) with the National Commissioner of the SAPS and the unit was created in 2002 and formally rolled out by 2004. The Rapid Rail Police is entrusted with ensuring the safety of commuters and their property whilst travelling by train. The functions of the SAPS RRP include, inter alia, the provisioning of a visible policing service in the railway corridors to address the safety of commuters and passengers on trains, provide a rapid rail police service, conduct preventative and reactive crime-combating operations, and conducting crime awareness campaigns.

The RRP are actively involved in policing the long-distance passenger trains, the Shosholozha Meyl, the Blue Train, Gautrain and freight rail. Their functions include cross-border operations (transnational crimes) and disruptive operations (in terms of the Crime Pattern and Crime Threat Analysis) and acting as a rapid response service to the rail environment. The railway environment has been plagued by various forms of criminal activities; and since the re-introduction of the SAPSRPU there have been some co-ordinated efforts to deal with such occurrences and to bring the perpetrators to justice (Maluleka, 2010).

## **5 METHODOLOGY**

Data collection approach for this research paper will make use of quantitative and qualitative data collection methods.

### **5.1 QUANTITATIVE DATA**

The quantitative data collection procedure included the collection and analysis of security strategy information and data submitted to the Regulator, the collection of security incident reports compiled by PRASA and Gautrain (BOC), the review of Corrective Action Plans developed by PRASA and Gautrain (BOC), the review of security statistics provided by PRASA and Gautrain (BOC), security systems used internationally through articles and journals, the identification of risk mitigation methodologies used by similar international rail commuter operators, as well as analysis of other relevant information from PRASA, Gautrain (BOC) and international railways. The quantitative data analysis is discussed in Section 7.

### **5.2 QUALITATIVE DATA**

The qualitative data collection approach included conducting meetings with relevant PRASA and Gautrain (BOC) employees to gather their insights on security systems currently implemented as well as how effective the security systems are, and interventions, distributing questionnaires to relevant PRASA and Gautrain (BOC) employees. The qualitative data is discussed in Section 8.

## 6 SECURITY SYSTEMS

### 6.1 SECURITY SYSTEMS AT PRASA

The PRASA and BOC Security plan state that they rely on SAPS, private security companies and own security guards. Security personnel are deployed in identified high risk areas for guarding of assets; protection of cash and staff in ticket offices and at sales points; protection of essential installations and assets, including, rolling stock; staging yards and overnight staging facilities, perway, electrical and signal Infrastructure; depots; and Stations. The systems include the following:

- Physical security (barriers, fences, doors, locks, signage, lighting etc.)
- Electronic security measures. CCTV for observation to detect crime and deter criminals,
- Procedural security (strategy, policies, plans and procedures)

The PRASA Security Plan specifies a 4-year phased approach to enhance security systems as follows:

- The development of manned and unmanned control rooms to allow “a prevention is better than cure approach”. As per the security plan, technology, and intruder detection will allow PRASA security to increase management command and control.
- Centralised security control room, operational 24 hours a day, seven days a week, where all incidents of crime and attempted crime are reported, CCTVs monitored, shifts and deployment of guards reported and monitored, suspect acts/objects monitored, and emergency services for safety and security and fire are activated, linked with the National JOC and Provincial/Regional JOCs.
- The development of an integrated plan to allow communities to take part in PRASA’s expansion of protection for the infrastructure.
- The monitoring and raiding of scrap yards, bucket shops, and stop and searches will intensify. The levels of organized crime will be targeted to allow the root cause of the crime to be stamped out.
- Implementation of drone technology and body cameras.



## **6.2 SECURITY SYSTEMS AT GAUTRAIN**

The BOC security plan states that the Operating Security Division (OSD) is responsible for the management and administration for various Security Systems. The following systems are managed by the Security Systems Officer (SSO) and is responsible for the system implementation, system review and system maintenance to ensure optimal utilisation and system integrity.

### **6.2.1 Security Analysis System (SAS)**

The SAS enables the OSD to report from anywhere within the system the occurrences which could affect the security incident management, risk management and SLA management.

### **6.2.2 Security And Access Management System (SAMS).**

The aim of the Security and Access Control Management System (SAMS) is to manage and control access to the restricted areas on the Gautrain network (e.g., Train and Bus Depot, Stations, shafts, MPS and APS).

### **6.2.3 Close Circuit Television (CCTV)**

The CCTVs are primarily for the BOC Operations Division.

### **6.2.4 Radio Communication**

The radio system used by BOC is part of the system specifications within the Concession Agreement.

### **6.2.5 Abloy Key Management System**

BOC has implemented a remotely managed Electronic Key Management System (ABLOY Clique Remote) at critical areas within stations as well as locks at the wayside gates and at the Autotransformer Paralleling Substations (APS).

### **6.2.6 Satellite Fleet Management System**

BOC has equipped each of the security vehicles with a satellite tracking fleet management system (CARTRACK).

Other third-party security providers include:

- South African Police Services (SAPS),
- Metropolitan Police Departments (MPD), and
- Different city structures such as City of Johannesburg (CoJ), City of Tshwane (CoT), Ekurhuleni Metropolitan Municipality (EMM).
- Airport Company of South Africa (ACSA).

## **6.3 COMPLIANCE ON SECURITY STANDARDS/POLICIES/PROCEDURES**

According to Maluleke (2010), policing on railways being a state subject, prevention of crime, registration of cases, their investigation and maintenance of law & order in Railway premises as well as on running trains are the statutory responsibility of the State Governments, which they discharge through Government Railway Police (GRP)/District Police. However, Railway Protection Force (RPF) supplements the efforts of GRP to provide better protection and security of passenger area & passengers and for related matters.

The Department of Transport is responsible for the regulation and coordination of transportation in South Africa. All railway operators in the Republic of South Africa are legally enjoined to include in their Safety Management System procedures, processes and systems aimed at the management of security as described in SANS 3000-1 (Railway Safety Management) and the RSR SMS determination of 2018. When operators apply for permits or for permit renewals the RSR assesses the security plans to determine if they meet the minimum requirements and to determine if security incident reporting protocols are in place. All rail operators are responsible for securing their rail systems.

The following are some of the legislative mandates applicable to PRASA and BOC:

- Constitution of the Republic of South Africa Act No. 108 of 1996,

- Control of Access to Public Premises and Vehicle Act No. 53 of 1985,
- Code of Conduct prescribed under the PSIRA Act No 56 of 2001,
- Criminal Procedure Act 51 of 1977,
- Consumer Protection Act No 68, 2008,
- Condensed Public Sector Risk Management Framework, 1 April 2010,
- Disaster Management Act No.57 of 2002,
- Firearms and Ammunition Control Act 60 of 2000,
- High Voltage Electrical Safety Standard,
- Legal Succession Act as amended,
- Minimum Information Security Standards (MISS),
- Minimum Physical Security Standards (MPSS) issued by the Government Security
- Occupational Health and Safety Act No.85 of 1993,
- Private Security Industry Regulation Act No 56 of 2001,
- Protection of Information Act No. 84 of 1982,
- Public Finance Management Act No. 1 of 1999,
- Prevention and combating of Corrupt Activities Act No. 12 of 2004,
- Railway Safety Regulator Act No 6 of 2002,
- Gauteng Transport Infrastructure Act (GTIA) Act 8 of 2001,
- Railway safety standard SANS 3000 series of standards and related Regulations on Safety and Security.

## 7 DATA ANALYSIS OF SECURITY INCIDENTS

This section of the research paper focuses on the security incidents that were recorded and reported to the RSR by PRASA and Gautrain (BOC) from April 2015 (financial year 2015/16) until March 2022 (financial year 2021/22). During data analysis there were limitations of analysis as follows:

- Data with blank information, and
- Gautrain places of incidents populated not describing the name of the place (e.g., shaft 1 or gate 88, not indicating whether the shaft is in Pretoria or gate number if it is in Centurion, etc.).

Figure 2 shows that PRASA had 23675 security incidents and Gautrain had 444 security incidents that occurred in the past 7 years (financial year 2015/16 to financial year 2021/22).

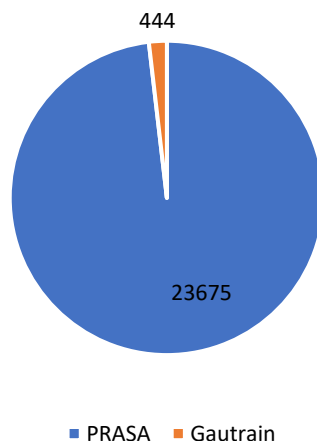


Figure 2: Total Number of Security Incidents in the past 7 years

### 7.1 SECURITY CATEGORIES

The research paper focuses on the following security categories:

- Category 1 (this is theft of railway infrastructure components on the mainline, yards, sidings and theft of train control equipment in sections)
- Category 2 (This is malicious damage or vandalism of railway infrastructure components on the mainline, yards, sidings and of train control equipment in sections)

- Category 7 (This is safety of persons in the train which could occur should a derailment occur and passengers are in the train or any criminal activities that could occur in the train).
- Category 8 (This is safety of persons at the train stations where criminal activities could occur and commuters are in the area, results of vandalism that leads to station no longer protected as well as assaults).
- Category 9 (This is safety of persons outside the train station or platforms where a derailment could occur and affect/damage the surrounding).

## 7.2 SECURITY INCIDENTS AT PRASA

The total number of security incidents per financial year (FY) for the past 7 years for PRASA is 23675 as illustrated in Figure 3. An increase of 54% from FY2015/16 to FY2017/18, an average of 4643 security incidents between FY2017/18 and FY2019/20 and a decrease of 71% of security incidents from FY2019/20 and FY2021/22 were recorded as illustrated in Figure 3.

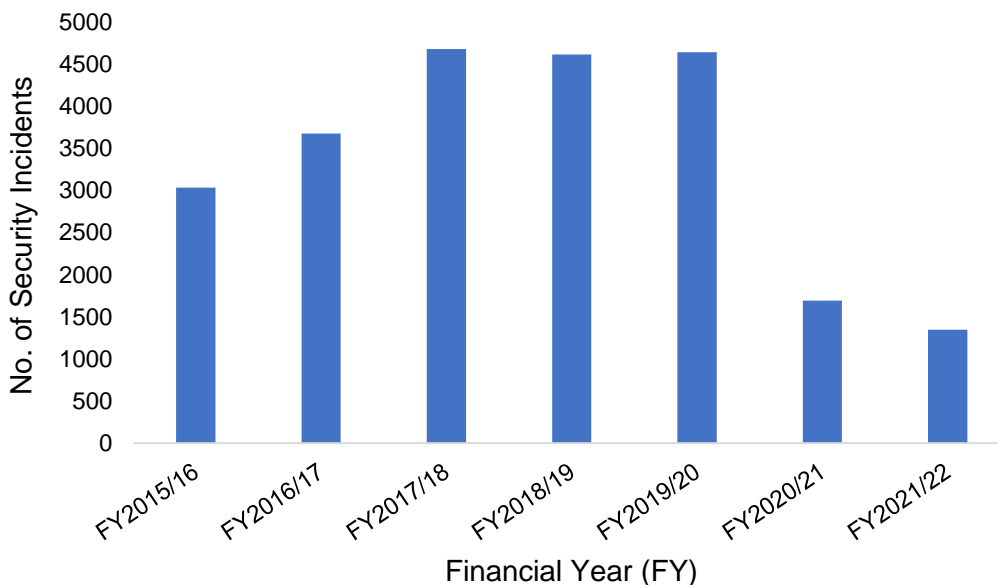


Figure 3: PRASA's security incidents per FY

It should be noted that the period from FY2020/21 and FY2021/20 was declared as a National State of Disaster (Lockdown) by the state due to the COVID19 pandemic outbreak. Level 5 and 4 restrictions were declared, where most of the economic activities in the country were brought to a

halt, thus during 2020 passenger rail transport was not in operation. Analysis also showed that the security incidents is neither a monthly trend nor seasonal in any given financial year.

PRASA recorded security incidents for provinces are illustrated in Figure 4. In the past 7 years, Figure 4 indicates Gauteng, Western Cape and Kwazulu-Natal as the top 3 provinces with the highest security incidents between FY2015/16 and FY2021/22.

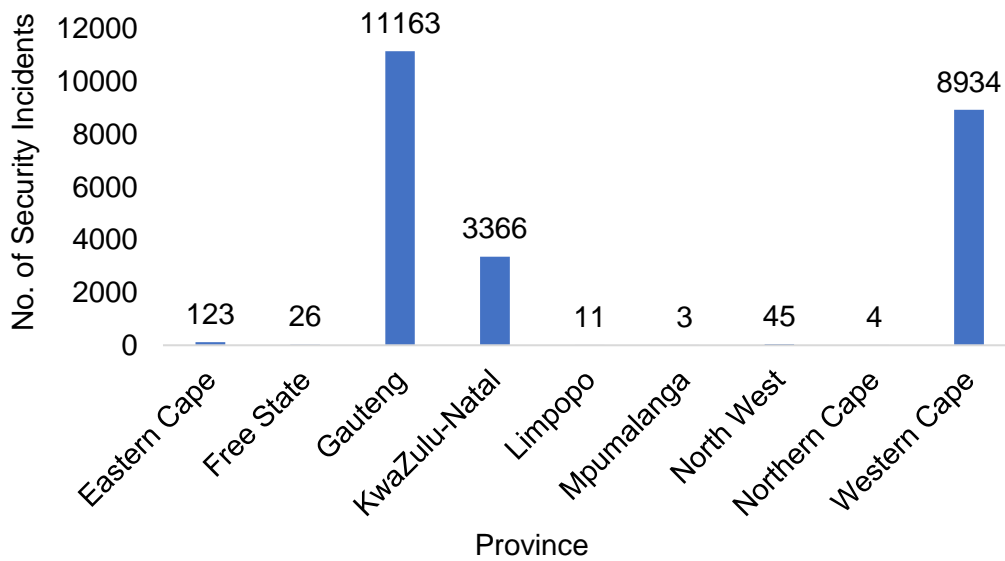


Figure 4: Security incidents per province

Figure 5 shows the top 3 provinces with the highest security incidents per FY recorded in PRASA from FY2015/16 to FY2021/22. As illustrated in Figure 3, Figure 5 shows similar trend analysis of security incidents increase between FY2015/16 and FY2017/18 and a decrease between FY2019/20 to FY2021/22.

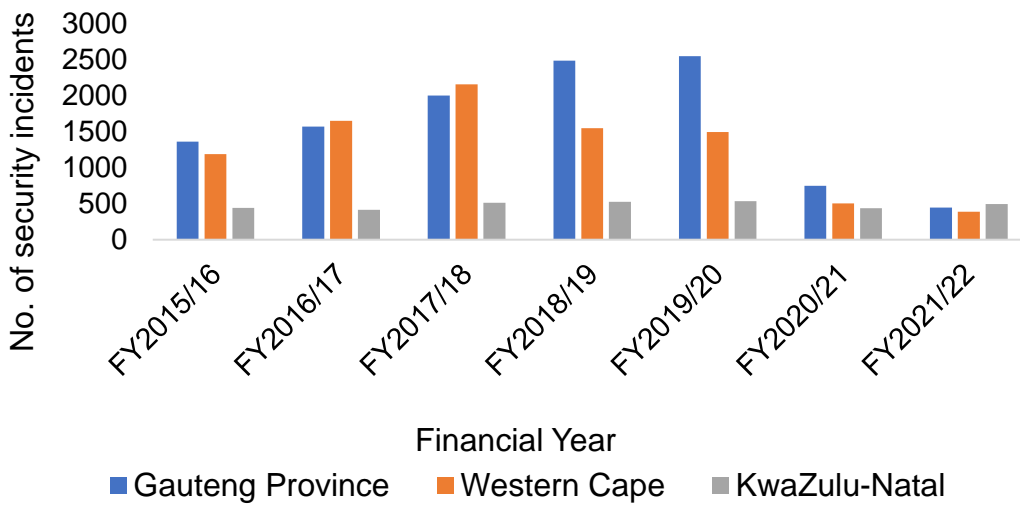


Figure 5: Top 3 provinces with highest security incidents per FY for PRASA

Figure 6 shows the number of security incidents per category type. Category 1 with the highest recorded incidents, followed by Category 2, 7, 8 and with Category 9 the least recorded at PRASA.

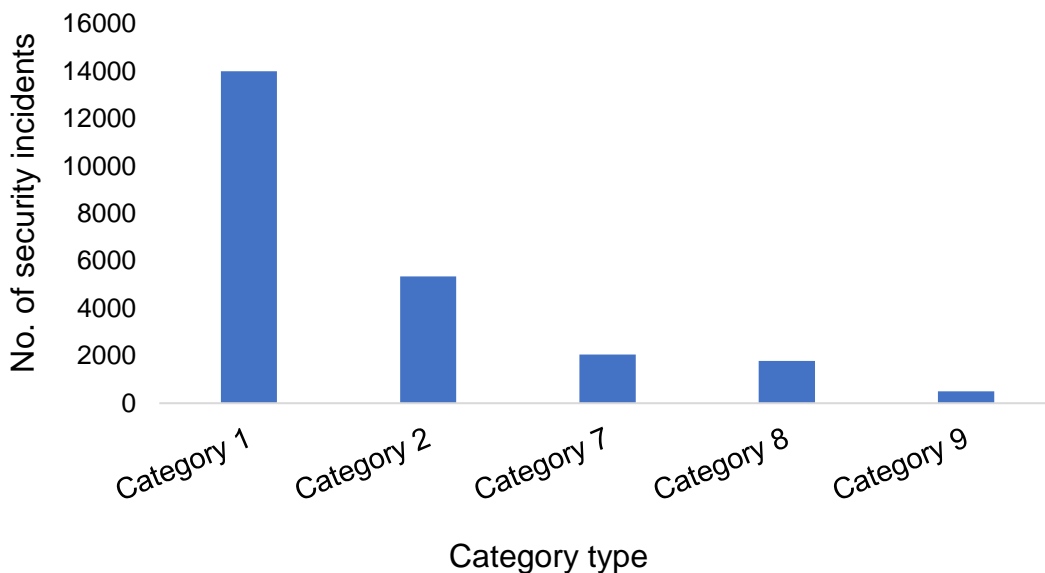


Figure 6: Security incidents per category type at PRASA

Category 1 incidents recorded for PRSASA were incidents listed below:

- Theft of train control equipment (signalling) in section,
- Theft of civil infrastructure components in section,

- Theft of rolling stock components in section,
- Malicious damage (vandalism) of rolling stock components in yards and sidings (staged),
- Malicious damage (vandalism) of train control equipment (signalling) in section,
- Theft of overhead traction equipment in section, and
- Theft of train authorisation, control and telecommunication systems and equipment in section.

Category 2 incidents recorded for PRASA were incidents listed below:

- Derailment of rolling stock on a line other than a running line,
- Fires on a fixed operational asset (for example, station buildings, in a tunnel, in a relay room and in a sub-station),
- Malicious damage (vandalism) of ancillary equipment including public address systems, information boards, CCTV,
- Malicious damage (vandalism) of civil infrastructure components in section,
- Malicious damage (vandalism) of Infrastructure in section,
- Malicious damage (vandalism) of infrastructure in yard and sidings,
- Malicious damage (vandalism) of overhead traction equipment in section,
- Malicious damage (vandalism) of overhead traction equipment in yards and sidings,
- Malicious damage (vandalism) of rolling stock components in section,
- Malicious damage (vandalism) of rolling stock components in yards and sidings (staged),
- Malicious damage (vandalism) of train control equipment (signalling) in section,
- Malicious damage (vandalism) of train control equipment (signalling) in yards and sidings,
- Malicious damage (vandalism) of train control equipment in sections,
- Malicious damage (vandalism) of ancillary equipment including public address systems, information boards, CCTV, and
- Theft of train authorisation, control and telecommunication systems and equipment in section.

Category 7 incidents recorded for PRSASA were incidents listed below:

- Aggravated robbery,



- Assault,
- Attempted murder,
- Common robbery,
- Murder,
- Rape,
- Robbery,
- Theft, and
- Personal Safety on Trains Aggravated robbery.

Category 8 incidents recorded for PRSASA were incidents listed below:

- Aggravated robbery,
- Assault,
- Attempted murder,
- Common robbery,
- Murder,
- Rape,
- Robbery,
- Personal Safety on Stations, and
- Personal Safety on Stations Aggravated robbery.

Category 9 incidents recorded for PRSASA were incidents listed below:

- Aggravated robbery,
- Assault,
- Attempted murder,
- Common robbery,
- Murder,
- Rape,
- Robbery,
- Theft,
- Personal Safety outside station platform- Area Aggravated robbery, and

- Personal safety outside station platform area (in section between stations, including yards, sidings and depots).

Further analysis indicated that Gauteng and Western Cape’s most recorded category with highest number of incidents is category 1, 2 and 7 whereas KwaZulu-Natal’s most recorded category with highest number of incidents is category 1, 2 and 8 (top 3 categories ranked from the highest to the lowest).

Security incidents recorded resulted in injuries and fatal injuries at PRASA cause reputational damage as well as business viability. The incident has a negative impact on the image of the rail transport as well as safety of its commuters. A total of 112 fatal injuries and 2634 injuries per category type have been recorded to the RSR by PRASA as indicated in Table 1. The category with the highest fatality injury record is category 8 and the category with the highest number of injuries is category 7.

Table 1: Fatal injuries and injuries stats per category type recorded at PRASA

	<b>Category 1</b>	<b>Category 2</b>	<b>Category 7</b>	<b>Category 8</b>	<b>Category 9</b>
<b>Injuries (No.)</b>	7	32	1335	979	281
<b>Fatal Injuries (No.)</b>	1	3	21	51	36

### 7.3 SECURITY INCIDENTS AT GAUTRAIN

The total number of security incidents per financial year (FY) for the past 7 years for Gautrain is 144 shown in Figure 7. A decrease of 27% of the security incidents recorded from FY2015/16 to FY2017/18, an increase of 104% of the security incidents from FY2017/18 and FY2018/19, and a decrease of 35% of the security incidents from FY2018/19 to FY2021/22 were recorded at Gautrain as illustrated in Figure 7.

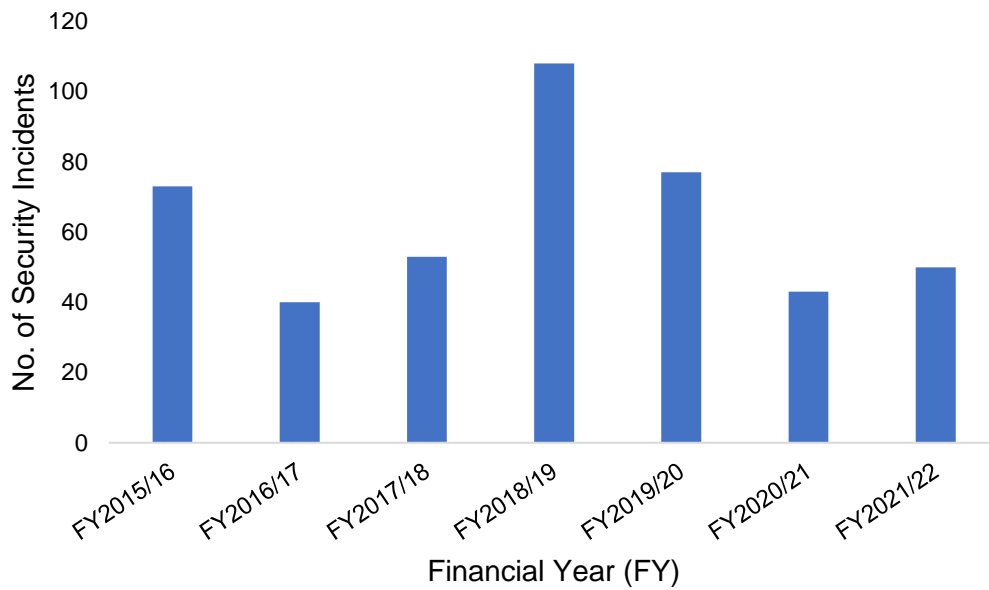


Figure 7: Gautrain’s security incidents per FY

Gautrain operates in Gauteng province only and has recorded the number of security incidents for places or areas illustrated in Figure 8 in the past 7 years. Figure 8 indicates Midrand, Centurion and Rhodesfield as the top 3 places or areas with the highest number of security incidents between FY2015/16 and FY2021/22.

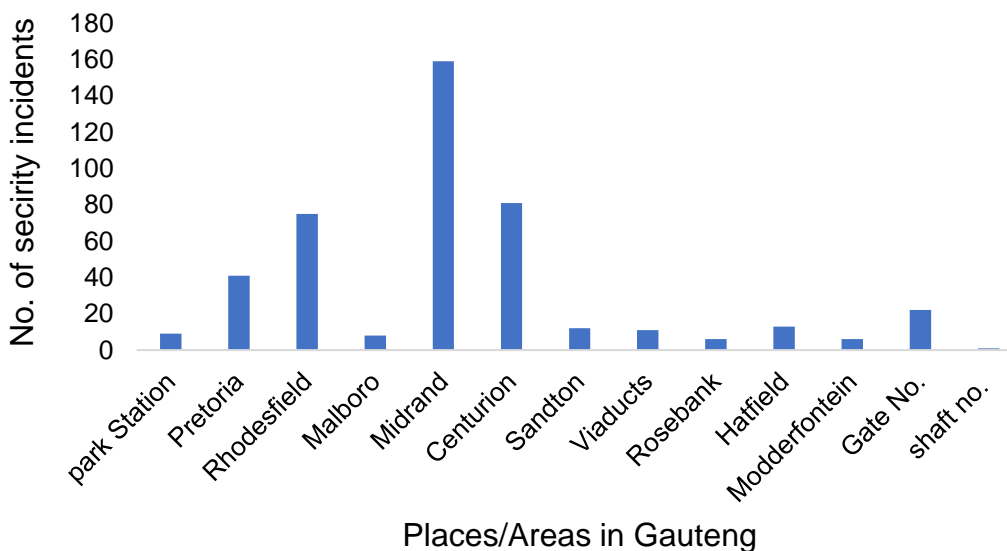


Figure 8: Security incidents per area/place per FY at Gautrain

Figure 9 shows the number of security incidents per category type. Category 2 with the highest recorded incidents, followed by Category 1, 8, 9 and 3 with the least recorded at Gautrain.

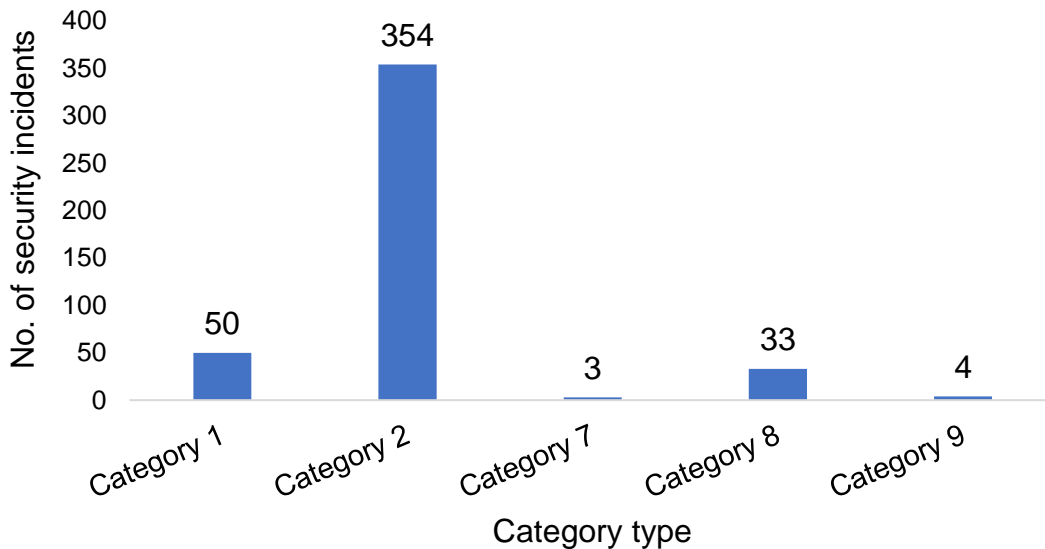


Figure 9: Security incidents per category type at Gautrain

The top 3 areas or places recorded category 2 as their highest type of security incidents occurring at Gautrain. Category 2 and 8 incidents recorded for Gautrain were incidents listed below:

- Aggravated robbery,
- Assault,
- Common robbery,
- Safety at station,
- Theft, and
- Derailment of rolling stock on a line other than a running line.

Category 1 incidents recorded for Gautrain were incidents listed below:

- Theft of civil infrastructure components in yards and sidings
- Theft of civil infrastructure components in section
- Derailment of rolling stock on a line other than a running line
- Theft of train control equipment (signalling) in section, and
- Theft.

There were security incidents recorded at Gautrain that resulted in injuries as shown in Table 2 with total number of 9 injuries per category type. The category with the highest injuries recorded is category 8, which is in the top 3 security incidents in the Gautrain railway system as shown in Figure 9.

Table 2: Fatal injury and injuries stats per category type recorded at Gautrain

	Category 1	Category 2	Category 7	Category 8	Category 9
<b>Injuries (No.)</b>	0	1	1	6	1
<b>Fatal Injuries (No.)</b>	0	0	0	0	0

## **8 DISCUSSIONS**

The research team conducted interviews with PRASA and BOC security management teams to gather information on security systems within their organisations. The results of the interviews are summarised in Annexure A and Annexure B.

### **8.1 PRASA INTERVIEWS**

Discussions with PRASA revealed that they have a corporate level security strategy and operational security plans at regional level. Each of the four PRASA region develop specific security operational plans based on the region's risk profile and in-line with the corporate security objectives.

PRASA's security organisational arrangement consists of the head office and four regional structures. PRASA insources and outsources security personnel. PRASA highlighted the challenges associated with insourcing and outsourcing security personnel as detailed in Annexure A.

PRASA's high security incidents in 2019 to 2020 were due to the cancellation of security contracts without contingency plans to guard the system and PRASA's railways system which is an open system. This left the system vulnerable to theft and vandalism which compromised passenger safety. From 2020 to 2021 there was marked decrease in passenger security incidents recorded as there were no train services due the national COVID19 lockdown.

### **8.2 BOC/GAUTRAIN INTERVIEWS**

The results of the interviews with BOC/Gautrain are detailed in Annexure B.

BOC/Gautrain has a security management plan developed based on the risk profile of its railways system.

BOC's security organisational arrangement consists of inhouse security managers and security assistance managers at every station and all guards are outsourced from three different security companies.

BOC/Gautrain has a closed railway system. The system is fenced and has a controlled access along the entire length and monitored by CCTV cameras; this contributes to the low rate of theft and vandalism recorded over the seven-year period.

During the COVID19 lockdown period BOC/Gautrain's passenger security incidents were lower because there were no train services, and a strategic plan was implemented to deploy security guards to secure its infrastructure.

## 9 FINDINGS

### 9.1 SECURITY INCIDENTS FINDING

- Increased number of security incidents at PRASA were due to:
  - Cancellation of security contracts, and
  - National COVID19 lockdown of 2020 and 2021.
- Low rate of passenger security incidents at BOC/Gautrain were due to:
  - The management and implementation of security plans at BOC is more effective than at PRASA evidenced by management commitment of resources towards security and safety and the relatively low number of recorded security incidences
- A decrease in the recorded security incidents by 66% from FY2019/20 to FY2021/22 may be due to the effects of the Covid-19 pandemic. During this period services were curtailed and there was rampant theft and vandalism of the railway infrastructure which rendered most of the system inoperable and no staff to record the security related incidents as they occur.
- Provinces with the highest recorded security incidents are Gauteng, Western cape and Kwazulu-Natal in that order at PRASA.
- Areas or places with the highest security incidents recorded are Midrand, Centurion and Rhodesfield respectively at Gautrain.
- Security category types at PRASA with the highest security incidents recorded are, category 1, 2 and 7.
- Categories with the highest fatal injuries are category 8, 9 and 7 ranked for the highest fatal injury number at PRASA.
- Categories with the highest injuries are category 7, 8 and 9 ranked from the highest injuries at PRASA.
- Category type with the highest injuries recorded is category 8 at Gautrain.
- Security incidents increased over the first 5 (five) years of the 7 (seven) year evaluation period before the state declared a national state of disaster (Lockdown) due to the COVID19 virus in the last 2 (two) years.



## 10 RECOMMENDATIONS

- Installation and update of the security systems such as CCTV cameras in stations and high-risk operational areas.
- Operators to make use of drones.
- Operators to make use of security systems with artificial intelligence.
- Security management decisions should be based on sound risk management practices and change management processes (e.g., high rate of security incidents that occurred after the cancellation of security contracts without considerations of measures to mitigate the risk).
- Emergency response drills, training and implementing security awareness programs for rail passengers and employees.
- Development of security specific Memorandum of Understanding/Interface Agreement to clarify roles and responsibilities of interfacing organisations and state organs.
- Operators to develop a quantitative security risk assessment.
- Operators to benchmark with other railway and non-railways operators to learn from each other.
- Innovative interventions for operators with vast open railway systems.
- The RSR to monitor and oversee implementation of operator security plans.
- Further research study may be conducted on effects of how artificial intelligence security systems can improve passenger safety.

## **11 CONCLUSIONS**

Railway security systems play a vital role in ensuring passenger safety and success of passenger rail operators. Commuters make decisions to use trains as their mode of transport based on their perception of safety and security.

PRASA and BOC have developed strategies and operational plans to manage security in their railway environments. They have put in place security systems to safeguard their infrastructure from theft and vandalism and to protect commuters and assure passenger safety and security in trains, at stations and within and around station precincts.

The effectiveness of the security systems is assessed by analysing passenger security incidences. The relatively low incidences in BOC are attributed to deployment of more warm bodies in trains and stations, CCTV cameras in trains, on stations and along the railway lines and a completely closed system. PRASA needs to deploy more warm bodies, restore CCTV cameras on all stations, install CCTV cameras along the railway line and close its system.

To improve passenger security the railway operators, need to continually conduct risk assessments of their environment, update absolute security systems, conduct research on latest trends in railway security management and benchmark against best practises.

## 12 REFERENCES

1. Bachok, S., Osman, M. M., Murad, M., & Ibrahim, M. (2014). An assessment of Commuters' perceptions of Safety and Comfort Level of 'Women-Only Coach'. The Case Study of KTM Komuter Malaysia. *Procedia Environmental Sciences*, 20, 197 – 205.
2. Borjesson, M. (2012). Valuing Perceived Insecurity Associated With Use of And Access To Public Transport. *Transport Policy*, 22, 1-10.
3. Carlson, A., Frincke, D. and Laude, M., 2003. Railway security issues: A survey of developing railway technology. In *Proceedings of the International Conference on Computer, Communications and Control Technologies* (Vol. 1, pp. 1-6).
4. Coppola P and Silvestri F, *Case Studies on Transport Policy* 8 (2020) 1127–1136. Assessing travelers' safety and security perception in railway stations.
5. D'Amore, P. and Tedesco, A., 2015. Technologies for the implementation of a security system on rail transportation infrastructures. In *Railway Infrastructure Security* (pp. 123-141). Springer, Cham.
6. De Ona J, de Ona R, Calvo FJ (2012) A classification tree approach to identify key factors of transit service quality. *Expert Syst Appl* 39:11164–11171.
7. Department of Transport. (2015, August). *National Rail Policy: Green Paper*.
8. Eboli L, Mazzulla G (2011) A methodology for evaluating transit service quality based on subjective and objective measures from the passenger's point of view. *Transport Pol* 18:172–181.
9. Government Accountability Office (GAO), 2007 *Passenger Rail Security: Federal Strategy and Enhanced Coordination Needed to Prioritize and Guide Security Efforts: Testimony Before the Subcommittee on Homeland Security, Committee on Appropriations, House of Representatives, Washington, D.C.: U.S. Government Accountability Office (GAO), GAO-07-459T, February 13, 2007. As of November 8, 2007: <http://purl.access.gpo.gov/GPO/LPS80711>.*
10. Hamid, N.A., Tan, P.L., ZALI, M.F.M., Rahamat, N.U. and Abd Aziz, N., 2015. Safety and security needs of commuter rail services-travellers' perceptions. *Journal of the Eastern Asia Society for Transportation Studies*, 11, pp.1495-1506.
11. Hansson, J., Pettersson, F., Svensson, H., & Wretstrand, A., 2019. Preferences in regional public transport: a literature review. *European Transport Research Review* (2019).

12. Iseki, H., & Taylor, B. D. (2010). Style versus service? An analysis of user perceptions of transit stops and stations. *Journal of Public Transportation*, 13(3), 23 – 48.
13. Jankura, R., 2021. Assessment of Fenestration Security as Part of Railway Infrastructure, *Transportation Research Procedia*, Volume 55, Pages 1555-1562, ISSN 2352-1465, <https://doi.org/10.1016/j.trpro.2021.07.187>.
14. Kubas, J., Soltes, V., Misik, J., Stofkova, Z., 2017. Efficiency of using financial resources and their impact on security in a local context, 12th International Scientific Conference of Young Scientists on Sustainable, Modern and Safe Transport. High Tatras, Slovakia.
15. Maluleke, M.G. 2010 Evaluation of the place and role of the re-introduced South African Police Service Unit in the City of Tshwane Metropolitan municipality (Doctorate Dissertation, North West University).
16. Matsika, E., Ricci, S., Mortimer, P., Goergiev, N., & O’Neil, C. (2013). Rail vehicles, environment, safety and security. *Research in Transportation economics*, 41(1), 43-58.
17. Ndobe, N., Qomfo, Z., Mndaweni, T., 2022 Safety Management System Report Gautrain\_BOC. ANNUAL SAFETY IMPROVEMENT PLAN 2021/2022.
18. News24, Speeding Shosholoza Mely stopped in its tracks following fatal train crash.
19. Pierluigi Coppola, Fulvio Silverstri, 2020 Assessing traveller’s safety and security perception at railway stations.
20. Pietre-Cambacedes, L., &Chaudet, C. (2010). The SEMA referential framework: avoiding ambiguities in the terms “security” and “safety”. *International Journal of Crotoal Infrastructure Protection*, 3(2), 55-66.
21. Railway Safety Regulator, 2022. Submittal Review Report: RSRR/0938 N – 26/08/22 – AS/1/6/0-01/2– 1187, RSR(MWC)1187/26/08/22. 15 September 2022.
22. Redman, L., Friman, M., Garling, T., Hartig, T., 2013. Quality attributes of public transport that attract car users: a research review. *Transp. Policy* 25 (2013), 119–127.
23. Rundmo, S., Ufarsson, G. F., and Hennessey, T. J. (2011). The role of risk perception and other risk related judgements in transportation mode use. *Safety Science*, 49, 226 – 235.
24. South Africa – ICOMOS World Report on Monuments and sites in Danger 2002: Heritage @ risk.
25. Sullivan, J. P. (1996). Transport crime and order maintenance: A North American perspectives, *Transit Policing March*, 3741.

26. Talbot, F. A. (2007). Railway Wonders of the world. Cassell and Company. P.606. (on the phone, p40, pdf, digitised in 2007).

## 13 ANNEXURES

### 13.1 ANNEXURE A: Interviews with PRASA held on the 17th of November 2022

No.	Questions	Response
1.	<p>How do you develop your security system?</p> <ul style="list-style-type: none"> <li>• Identification of stakeholders</li> <li>• Identification of security risk</li> <li>• Analysis of security risk</li> <li>• Mitigation and controls</li> </ul>	<p>Identifying of what needs to be protected and by what, the risks through risk assessment is the important aspect to commence with, the analysis of the risk and identifying stakeholders that will assist you to achieve all the risk controls and mitigations.</p> <p>Security plan commences from the corporate plan from PRASA head office that is standardised for regions to be guided in developing and implementing plans. It was noted that the regions are not the same in terms of risks, however all regions have infrastructure and train services they are operating.</p> <p>Internal and external stakeholders are consulted and they take part of risk, controls and mitigations identification and implementations.</p>
2.	<p>Is the security strategy being implemented?</p>	<p>Yes, the security strategy is being implemented currently.</p>
3.	<p>How effective is the security system in place?</p> <ul style="list-style-type: none"> <li>• What criteria do you use to measure the effectiveness?</li> </ul>	<p>The security strategy plan and security procedures are being evaluated and audited to ensure we assess the effectiveness of the plans in place.</p> <p>Security risk assessments are revised and conducted on yearly bases or after an incident that resulted in fatal injury/injuries,</p>

		<p>to evaluate the controls and mitigations that the organisation committed to.</p> <p>The evaluations are conducted by independent stakeholder from the head office to the regions. There are external audits conducted by Auditor General (AG) and internal audits from PRASA Rail team situated at the head office.</p>
4.	<p>What types of inside trains, on stations and station precincts security systems are currently being utilised in your organisation?</p>	<p>Warm bodies (security guards) are utilised as security inside the train and stations. There are no CCTV cameras functional due to theft and vandalism experienced at PRASA stations.</p> <p>However, there is a project underway to resuscitate the CCTV cameras as a form of security systems at stations.</p>
5.	<p>What types of security systems would you want introduced in your organisation for improvement of safety and security?</p>	<p>CCTV cameras and artificial intelligence technology to assist warm body security guards.</p> <p>Effective interface agreement with other entities sharing network with since there are challenges faced with in area where network is shared.</p> <p>CCTV cameras to be connected to fibre to be able to monitor outside the train activities since the CCTV in the EMUS are installed.</p> <p>Re-introduction of guards to be deployed at all stations and in all train in services currently running (EMUs and yellow trains)</p> <p>Electronic data systems to improve the management of capturing incidents to avoid data integrity issues currently faced</p>

		<p>within PRASA internally and transferred to the RSR.</p>
<p><b>6.</b></p>	<p>What are the challenges or shortcomings with regards to the systems in place?</p>	<p>Informal settlements along the railway line.</p> <p>It is challenging disciplining in-house guards due to company's policy in case of any asset securing measures that would have not been conducted. Thus, external guards would be more beneficial to the organisation.</p> <p>PRASA is categorised as an open railway system which result in assets such as stations and trains accessible to the public and which result in criminal activities taking place. Currently areas close to the stations are the only ones prioritised to have fencing installations.</p> <p>Lack of technologies to assist security guards such as CCTV at every station and inside the trains as well as introduction of drones.</p> <p>Ownership and accountability to deploy security in areas or province where PRASA does not own the network which results in risk subjected to passengers when the network owner does not deploy security systems accordingly.</p> <p><i>Yellow trains are not receptive to the CCTV camera technology.</i></p> <p>Vandalism of CCTV caners installed at stations.</p> <p>Trains operated at Transnet's network are exposed to risk due to lack of security systems deployed and delayed repairing of</p>



		assets vandalised at stations in the Eastern cape.
7.	SWOT (Strength, Weakness, Opportunities and Threats) analysis of the security systems in place?	<p><b>Strength</b></p> <ul style="list-style-type: none"> <li>• Issuing of security uniform creating visibility</li> <li>• The deployment of the EMUs with advanced safety aspects than the yellow trains</li> <li>• Introducing new rules such as prohibition of church activities, trading, gambling and smoking in the trains</li> <li>• Security incident management</li> </ul> <p><b>Weakness</b></p> <ul style="list-style-type: none"> <li>• Lack of security contractors at some of the stations and staging yards</li> <li>• Lack of security artificial intelligence systems</li> </ul> <p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Improvement of the current security technologies in the blue train and stations</li> <li>• Employment of special security needs personnel</li> </ul> <p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Informal settlements along the railway line</li> <li>• Vandalism of infrastructure theft (Rolling Stock)</li> <li>• Violent passenger behaviour during delays and income generating actions</li> <li>• Service delivery protest actions</li> <li>• Accessibility (open system), no adequate barricading</li> <li>• Burning of train sets</li> </ul>

		<ul style="list-style-type: none"> <li>• Taxi services more reliable than trains due to train schedule not always on time due to theft and vandalism other things that may occur in the railways system</li> </ul>
8.	<p>Security incident management</p> <ul style="list-style-type: none"> <li>• Who records the incident?</li> <li>• What are the most critical parameters to be recorded in an incident?</li> <li>• How is data provided to the RSR verified.</li> <li>• Who reports the incidents to the RSR?</li> </ul>	<p>The incident recording procedure as per SANS 3000 series and procedure issued by the RSR for recording of incidents is being followed.</p> <p>Training of staff member that records and reports incidents is done to ensure that incidents are recorded according to specified categories.</p>
9.	<p>High theft and vandalism rate prior and during lockdown (FY2020/21 &amp; FY2021/22)</p> <ul style="list-style-type: none"> <li>• What caused the high rate <ul style="list-style-type: none"> <li>o Root cause and contributing factors</li> </ul> </li> <li>• PRASA has embarked on a recovery programme or resumption of the train services, what is being done to prevent the high rate of security incidents <ul style="list-style-type: none"> <li>o What is being implemented from management to the daily operations onsite</li> </ul> </li> </ul>	<p>Prior to the national COVID19 lockdown PRASA's station infrastructure had a high rate of incident recorded due to insufficient guards deployed, termination of security contracts and removal of the CCTV cameras except for the CCTV cameras inside the ticket offices.</p> <p>PRASA has embarked on a phased security employment project (outsourcing). Phase one and two were executed in August 2021 where approximately 3000 guards were employed and distributed across the network where train services have resumed. Some of the guards are stationed on stations and trains.</p> <p>There is a contract in place to install a fibre network.</p> <p>With the resumption of the train services (EMUs and Yellow trains):</p> <ul style="list-style-type: none"> <li>• August 2021. PRASA employed 3100 PRASA guards and distributed to various regions</li> </ul>

		In 2022, A three 3 phase external contract is being executed. Where Phase 1 was in June 2022, Phase 2 in October and Phase 3 is delayed since it was supposed to be in Dec 2022 to assist with protection of assets.
<b>10.</b>	<p>Data received by the RSR shows low security incidents reported/recorded for FY2020/21 and FY2021/22</p> <ul style="list-style-type: none"> <li>• Is this a true reflection?</li> <li>• Does this mean theft and vandalism was low?</li> <li>• What transpired during the lockdown?</li> <li>• Did PRASA personnel who record and report incidents continued working?</li> <li>• What was the process in place to record incidents as they occur?</li> <li>• what conclusion regarding the low incidents data recorded?</li> </ul>	<p>It was highlighted as a true reflection that low security incidents in relation to inside trains, on stations and station incidents.</p> <p>However, this does not imply that there were no criminal activities even though train services had stopped due to the national CIVD19 lockdown. It was revealed that during the high-rate incidents that occurred at stations in 2017, 2018 and 2019. PRASA did no repair most of the assets, thus during FY2020/21 and FY2021/22 there were no assets to vandalise.</p> <p>FY2020/21 and FY2021/22 were declared by the state as the national COVID19 lockdown and trains services were stopped, thus the number of passenger safety related incidents are low. PRASA is not yet in full service in all regions, corridors or line sections.</p> <p>There were no security guards in the railway systems during the national COVID19 lockdown.</p>
<b>11.</b>	Based on security incidents analysis, top 3 locations with high security incidents recorded are Gauteng, Western Cape and Kwa-Zulu Natal	Gauteng is in size, bigger than other regions. The organisation is re-structuring the corridors to ensure that managing in terms of security is also manageable.

	<ul style="list-style-type: none"> <li>• What is the main reason for these high rates in these provinces?</li> <li>• What is being done to reduce the security incidents in these provinces?</li> <li>• Anything for noting regarding these provinces?</li> </ul>	Sections/corridors that have resumed with train services have deployed security guards and they are significant
<b>12.</b>	<p>Based on the analysis conducted, Category 8, 9 and 7 resulted in high fatalities even though less occurring:</p> <ul style="list-style-type: none"> <li>• Are you aware?</li> <li>• What is your view/comments?</li> <li>• What is the root cause and contributing factors?</li> <li>• What is the plan or strategy to reduce such security incidents <ul style="list-style-type: none"> <li>o What do you think need to be improved from those causes to reduce or have zero security incidents?</li> </ul> </li> </ul>	<p>Security management team is aware.</p> <p>Most contributing factors are:</p> <ul style="list-style-type: none"> <li>• Aggravated robbery,</li> <li>• Assault,</li> <li>• Attempted murder,</li> <li>• Common robbery,</li> <li>• Murder,</li> <li>• Rape,</li> <li>• Robbery,</li> <li>• Personal Safety on Stations, and</li> <li>• Personal Safety on Stations Aggravated robbery</li> </ul>
<b>13.</b>	<p>Based on the analysis done, Category 1, 2 and 7 resulted in high or frequently recorded incidents:</p> <ul style="list-style-type: none"> <li>• Are you aware?</li> <li>• What is your view/comments?</li> <li>• What is the root cause and contributing factors?</li> <li>• What is the plan or strategy to reduce such security incidents?</li> <li>• What do you think need to be improved from those causes to reduce or have zero security incidents?</li> </ul>	<p>Security management team is aware.</p> <p>Most contributing factors are:</p> <ul style="list-style-type: none"> <li>• Theft of train control equipment,</li> <li>• Theft of civil infrastructure components in section,</li> <li>• Theft of rolling stock components in section,</li> </ul>

		<ul style="list-style-type: none"> <li>• Malicious damage (vandalism) of rolling stock (train) components in yards and sidings (staged),</li> <li>• Theft of train authorisation, control and telecommunication systems and equipment</li> </ul>
<b>14.</b>	What are the things that you would like to change regarding the security systems in your organisation?	Introduction of the CCTV and artificial intelligence technologies
<b>15.</b>	<p>What are the things you would like to improve regarding the security systems in your organisation?</p> <ul style="list-style-type: none"> <li>• Which method would you propose for these improvements?</li> <li>• What information from commuter surveys strongly influence your strategies.</li> <li>•</li> </ul>	<p>Introduction of the CCTV and artificial intelligence technologies.</p> <p>Customer surveys are conducted through an APP.</p>
<b>16.</b>	<p>Insourcing and outsourcing of security staff:</p> <ul style="list-style-type: none"> <li>• Which method is in place between Insourcing and outsourcing, or both is practiced?</li> <li>• How effective is the current contracting system (insourcing vs outsourcing)?</li> <li>• What are the challenges faced with insourcing security (Internal security staff)?</li> <li>• What are the challenges faced with outsourcing security (contractors)</li> <li>• What would be the preferred method between insourcing and outsourcing and why?</li> </ul>	<p>The insourcing and outsourcing methods are practiced by PRASA.</p> <p>The outsourcing of guards is more effective than the insourcing because of regulation practised towards external guards than internal guards governed by company's policy.</p> <p>Insourcing is scheduled as 4 days in and 4 days off and in terms of cost effective is acting negatively.</p> <p>Preferred method would be external guards practice based on the benefits associated with outsourcing in comparison with insourcing guards.</p>

<p><b>17.</b></p>	<p>Security management:</p> <ul style="list-style-type: none"> <li>• Recruitment process for security managers, supervisors and Staff</li> <li>• What training and development is offered for security managers, supervisors and staff? <ul style="list-style-type: none"> <li>o Initial training (induction)</li> <li>o Do you offer any refreshment courses or training security managers and supervisors and how often?</li> </ul> </li> </ul>	<p>Human resources recruitment processes are followed for insourcing and outsourcing personnel.</p> <p>Induction and training are conducted for internal and external security.</p>
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## 13.2 ANNEXURE B: Interviews with BOC/Gautrain held on the 29<sup>th</sup> of November 2022

No.	Questions	Responses
1.	<p>How do you develop your security system?</p> <ul style="list-style-type: none"> <li>• Identification of stakeholders</li> <li>• Identification of security risk</li> <li>• Analysis of security risk</li> <li>• Mitigation and controls</li> </ul>	<p>Security system is developed by firstly analysing risk according to the business needs, its operational nature, environment on which it operates and the organisational structure.</p> <p>Secondly with the risk outcomes, stakeholders are identified that have no direct interest to the business such as SAPS, entities that intercept with the business, etc. and stakeholders that have direct interest into the business such as internal staff.</p> <p>Lastly, stakeholders develop and implement security risk assessment inclusive of mitigations and controls.</p>
2.	<p>Is the security strategy being implemented?</p>	<p>Security management plan was recently revised, and a security strategy was recently developed internally.</p>
3.	<p>How effective is the security system in place?</p> <ul style="list-style-type: none"> <li>• What criteria do you use to measure the effectiveness?</li> </ul>	<p>From October 2022, security department is a standalone to introduce independency of security within the organisation.</p> <p>There is a security strategy that was drafted and about to be implemented towards end of the year (2022).</p> <p>There are external audits that are being conducted.</p> <p>There is a significant reduction of incidents which supports the effectiveness of the security initiatives in place.</p>

		The security plan and risk assessment are reviewed annually to ensure the effectiveness is measured and monitored.
4.	What types of inside trains, on stations and station precincts security systems are currently being utilised in your organisation?	CCTV cameras at the stations, guards and assistance supervisors stationed at every station and inside the trains.
5.	What types of security systems would you want introduced in your organisation for improvement of safety and security?	<ul style="list-style-type: none"> <li>• CCTV HD cameras</li> <li>• Artificial intelligence technologies such as drones, etc.</li> </ul>
6.	What are the challenges or shortcomings with regards to the systems in place?	<ul style="list-style-type: none"> <li>• Damaging of the fencing systems</li> <li>• Railway line is an open system and makes it easy for it to be assessable</li> <li>• Outdated CCTV cameras</li> <li>• Areas where organisations interfaces that lacks security accountability and responsibilities</li> </ul>
7.	SWOT (Strength, Weakness, Opportunities and Threats) analysis of the security systems in place?	<p>Strength</p> <ul style="list-style-type: none"> <li>• Outsourcing of security workforce</li> <li>• Guards and assistance supervisors deployed at every stations</li> </ul> <p>Weakness</p> <ul style="list-style-type: none"> <li>• Outdated CCTV cameras</li> </ul> <p>Opportunities</p> <ul style="list-style-type: none"> <li>• Improving on current technologies</li> </ul> <p>Threats</p> <ul style="list-style-type: none"> <li>• Railways line is an open system</li> </ul>
8.	Security incident management <ul style="list-style-type: none"> <li>• Who records the incident?</li> </ul>	The incident recording procedure as per SANS 3000 series and procedure issued



	<ul style="list-style-type: none"> <li>• What are the most critical parameters to be recorded in an incident?</li> <li>• How is data verified to be provided to the RSR?</li> <li>• Who report the incidents to the RSR?</li> </ul>	<p>by the RSR for recording of incidents is being followed.</p> <p>Training of staff member that records and reports incidents is done to ensure that incidents are recorded according to specified categories.</p>
<b>9.</b>	<p>High theft and vandalism rate prior and during lockdown (FY2020/21 &amp; FY2021/22)</p> <ul style="list-style-type: none"> <li>• What caused the high rate <ul style="list-style-type: none"> <li>o Root cause and contributing factors</li> </ul> </li> </ul>	<p>The most contributing factor is damaging of the fencing systems.</p>
<b>10.</b>	<p>Data received from the RSR shows low security incidents reported/recorded for FY2020/21 and FY2021/22</p> <ul style="list-style-type: none"> <li>• Is this a true reflection?</li> <li>• Does this mean theft and vandalism was low?</li> <li>• What transparent during the lockdown</li> <li>• Did BOC/Gautrain personnel who record and report incident continue working?</li> <li>• What was the process in place to record incidents as they occur?</li> <li>• what conclusion regarding the low incidents data recorded?</li> </ul>	<p>Data analysed and incident records for FY2020/21 and FY2021/22 are a true reflection as follows:</p> <ul style="list-style-type: none"> <li>• In the year 2020 and 2021 SA was under the national COVID19 lockdown and there were no train services until late 2021 when the restrictions where lowered, passenger related incidents would not be recorded since there would not be any commuters</li> <li>• There was a strategy implemented to recall all guards for duty since incidents were still occurring at stations or yards in terms of securing rolling stock and infrastructure at the stations and yards and fencing being damaged</li> <li>•</li> </ul>
<b>11.</b>	<p>Based on security incidents analysis, top 3 locations with high security incidents recorded are Midrand, Centurion and Rhodesfield:</p> <ul style="list-style-type: none"> <li>• What is the main reason for these high rates in these areas?</li> </ul>	<p>The top 3 areas with high number of security incidents are due to the nature and geographical position on high-rate crime in Gauteng which then poses safety risk to passengers and some of the incidents where passengers behaviour issues.</p>

	<ul style="list-style-type: none"> <li>• What is being done to reduce the security incidents in these areas?</li> <li>• Anything for noting regarding these areas?</li> </ul>	Security guards are trained to intervene should passengers fight amongst themselves, as well effective patrol of guards inside train.
<b>12.</b>	<p>Based on the analysis conducted, Category 8 resulted in high injury even though they less occurring:</p> <ul style="list-style-type: none"> <li>• Are you aware?</li> <li>• What is your view/comments?</li> <li>• What is the root cause and contributing factors?</li> <li>• What is the plan or strategy to reduce such security incidents <ul style="list-style-type: none"> <li>o What do you think need to be improved from those causes to reduce or have zero security incidents?</li> </ul> </li> </ul>	<p>Security management team is aware.</p> <p>These were passenger related behaviour matters/issues at the station and scenes such as, assault, common robbery, theft, safety at station, etc.</p> <p>The risk assessment was revised, and more controls were implemented in relation to the scope of the guards duty.</p>
<b>13.</b>	<p>Based on the analysis done, Category 2, 1 and 8 resulted in high or frequently recorded incidents:</p> <ul style="list-style-type: none"> <li>• Are you aware?</li> <li>• What is your view/comments?</li> <li>• What is the root cause and contributing factors?</li> <li>• What is the plan or strategy to reduce such security incidents?</li> <li>• What do you think need to be improved from those causes to reduce or have zero security incidents?</li> </ul>	<p>Security management team is aware</p> <p>Root cause where incidents such as, theft of train control equipment in section, theft of civil infrastructure components in yards and sidings, assault, common robbery, theft, safety at station, etc.</p> <p>The risk assessment was revised, and more controls were implemented in relation to the scope of the guards duty</p>
<b>14.</b>	<p>What are the things that you would like to change regarding the security systems in your organisation?</p>	<p>Updating the current CCTV cameras deployed since this will assist to visualise aspects that cannot be seen in the current CCTV cameras due to the outdated technology.</p>

<p><b>15.</b></p>	<p>What are the things you would like to improvement regarding the security systems in your organisation?</p> <ul style="list-style-type: none"> <li>• Which method would you propose for these improvements?</li> </ul>	<p>Installed CCTV cameras consist of outdated systems.</p> <p>An upgraded CCTV HD cameras would be the preferred method which would assist to visualise aspects that cannot be seen in the current CCTV cameras due to the outdated technology.</p> <p>Use of drones and artificial intelligence technology outside of platforms/stations which would assist to reduce fencing damages that result in posing risk for passengers.</p>
<p><b>16.</b></p>	<p>Insourcing and outsourcing of security staff:</p> <ul style="list-style-type: none"> <li>• Which method is in place between Insourcing and outsourcing, or both is practiced?</li> <li>• How effective is the current contracting system (insourcing vs outsourcing)?</li> <li>• What are the challenges faced with insourcing security (Internal security staff)?</li> <li>• What are the challenges faced with outsourcing security (contractors)</li> <li>• What would be the preferred method between insourcing and outsourcing and why?</li> </ul>	<p>BOC/Gautrain security workforce is outsourced from three different entities which includes managers, supervisors and guards. The only inter security workforce is the management and assistance managers that are stationed at every station with external security guards.</p> <p>No challenges recorded for insourcing since there are no guards employed internally.</p> <p>External contracts challenges are social economic based challenges. Where security guards unavailability is affected during public transport strikes, external staff familiar with security systems in place and risk posed should such guards experience job security issues.</p> <p>The preferred method is in place as fully outsourcing of guards since insourcing would results in accommodating staff for days off while paying full salary (cost-effective), absence in terms of any people management matters and could not</p>

		<p>replace, thus shortage of guards regularly of securing assets, disciplinary actions for insourcing would be governed by company's policy, etc.</p>
<p><b>17.</b></p>	<p>Security management:</p> <ul style="list-style-type: none"> <li>• Recruitment process for security managers, supervisors and Staff</li> <li>• What training and development is offered for security managers, supervisors and staff? <ul style="list-style-type: none"> <li>o Initial training (induction)</li> <li>o Do you offer any refreshment courses or training security managers and supervisors and how often?</li> </ul> </li> </ul>	<p>There is a contract management in-place which enforces external providers to ensure that induction and trainings are conducted for staff working in the organisation and external service providers.</p>