



# State of Safety Report **2018/19**



# State of Safety at a glance





88.4 Fatalities Weighted injuries due to security-related occurrences **15%**

284 fatalities as a result of people struck by trains **17%**

223 injuries as a result of people struck by trains **9%**

18 fatalities as result of people traveling outside designated passenger areas **28%**

156 injuries as result of people traveling outside designated passenger areas **11%**

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# Abbreviations

<b>Act</b>	National Railway Safety Regulator Act No 16 of 2002 (as amended)
<b>aSoSR</b>	Annual State of Safety Report
<b>BOC</b>	Bombela Operating Company
<b>DoL</b>	Department of Labour
<b>DoT</b>	Department of Transport
<b>FWI</b>	Fatalities and Weighted Injuries (10 injuries are equivalent to 1 fatality)
<b>NIMS</b>	National Information Monitoring System
<b>PRASA</b>	Passenger Rail Agency of South Africa
<b>PRASA Rail</b>	A division of PRASA formerly called Metrorail or SARCC (South African Rail Commuter Corporation)
<b>PSTB</b>	People Struck by Trains
<b>PTI</b>	Platform-train Interchange (alternatively Interface) occurrences
<b>RRP</b>	Rapid Rail Police
<b>RSR</b>	Railway Safety Regulator
<b>RTMC</b>	Road Traffic Management Corporation
<b>SANS</b>	South African National Standard
<b>SANS</b>	South African National Standard for Railway Safety
<b>SAPS</b>	South African Police Service
<b>SPAD</b>	Signal Passed at Danger
<b>SoS</b>	State of Safety
<b>SUMATRA</b>	The Surface and Marine Transport Regulatory Authority (Tanzania)
<b>TCO</b>	Train Control Officer
<b>TFR</b>	Transnet Freight Rail
<b>Transnet</b>	Transnet SOC Ltd





# CEO's Foreword



# CHIEF EXECUTIVE OFFICER'S FOREWORD

Section 20 of the National Railway Safety Regulator Act No. 16 of 2002, as amended, requires the Railway Safety Regulator to produce and submit an annual State of Safety Report to Parliament on the safety of railways in the country.

The State of Safety Report provides a snapshot of the safety of our railways and can be used as a diagnostic tool to detect where the challenges are and what causes them, with the intention of identifying and implementing safety interventions to improve the safety of railway operations.

The report provides an analysis of harm to persons, inclusive of the public, passengers and the workforce which is expressed as fatalities and weighted injuries (FWIs). This equivalent measure is calculated using a formula which equates 10 injuries, regardless of the seriousness of the injury, to one fatality.

The State of Safety Report for this reporting period highlights increasing long-term trends in both the safety and security-related incidents. This is alarming since the Regulator has noticed an overall reduction in network traffic of 18 per cent since 2012/13. In the same vein, occurrences per million train km increased by 14 per cent, while security-related incidents per million train km increased dramatically by 175 per cent.

Since 2010/11, on average, 649 fatality and weighted injuries resulted from operator occurrences. Of these, 60 per cent resulted from people struck by trains during the movement of rolling stock. The three large metropolitan areas in the Gauteng, KwaZulu-Natal and Western Cape province, each with high commuter traffic volumes, have recorded 89 per cent of the FWIs.

These startling statistics are indicative of a rail environment that is not safe for the commuters it serves as well as the public. This is in contradiction with our vision of Zero Occurrences. It also undermines our efforts to improve safety within our railways.

On a positive note, I would like to point out that TFR and PRASA's total train derailments have decreased by 16 per cent during the year under review when compared with the previous financial year. On a per million train km normalised basis, this represents an 8% per cent decrease due to the lower traffic volumes. Since 2010/11, the FWI value pertaining to derailments for both TFR and PRASA also decreased by a staggering 76 per cent to 3,8 in 2018/19. On a per million train km normalised basis.



I, however remain resolute that we will have to redouble our efforts in enforcing our regulatory regime. If we hope to change this picture going forward, we will require even more commitment and collaboration from the stakeholders in the rail sector. I am, however, hopeful that we will turn the corner and change the current rail landscape. The support we are getting from the Department of Transport and rail stakeholders at large are encouraging.

In support of the Minister of Transport's ethos, we will ensure that all our efforts are underpinned by the principle of "kawuleza" to ensure that the quality and reliability of our rail service is restored.

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Ms Tshupo Kgare

**ACTING CHIEF EXECUTIVE OFFICER**

# EXECUTIVE SUMMARY

The Railway Safety Regulator (RSR) is mandated to oversee railway safety in South Africa. In compliance with Section 20 of the National Railway Safety Regulator Act, the RSR annually produces and submits to the Minister of Transport a report on the safety of railway workers, the public and the environment associated with railway operations within South Africa – the Annual State of Safety Report (ASoSR).

The ASoSR provides verified data on the prevalence of railway operations-related occurrences (hereinafter referred to as occurrences) and security-related incidents (hereinafter referred to as incidents). Furthermore, the report provides an analysis of this data and contains information on the risk areas and trend analysis.

The report provides an analysis of harm to persons (inclusive of the public, passengers and workforce); this harm is expressed as fatalities and weighted injuries (FWIs). This equivalent measure is calculated using the following formula: [number of fatalities] + 0.1 x [number of injuries], i.e., 10 injuries are equivalent to 1 fatality regardfewer of the seriousness of the injury. The contributions across the occurrence and incident categories to harm are presented in order to provide an understanding of the initiating events or sources of reported harm levels.

Furthermore, the Report places the reported levels of harm into context by providing specific safety oversight activities undertaken by the RSR as provided by the enabling legislation.

The activities included were planned with the intention of controlling the known risk areas and reactive controls aimed at preventing recurrences of accidents, sub-standard acts and conditions.

This State of Safety report must be read in the context of productivity levels at the two largest operators. In round figures:

- Transnet Freight Rail produced 37 million train km and 146 billion tonne km in 2018/19.
- PRASA (including Metrorail and Shosholoza Meyl)

produced 20 million train km and 5,7 billion passenger km in 2018/19.

## Safety Overview

The safety overview indicates increasing trends in security-related incidents as well as safety-related occurrences.

### Noteworthy statistics for 2018/19 include:

- Despite an overall 18 per cent reduction in network traffic since 2012/13, operator occurrences per million train km increased marginally by 14 per cent, but security-related incidents per million train km increased dramatically by 175 per cent increase.
- Since 2010/11, on average, 649 Fatalities and Weighted Injuries (FWI: 10 injuries are equivalent to 1 death) resulted from railways operations. Of these, 60 per cent resulted from SANS category E - People struck by trains during movement of rolling stock.
- The three large metropolitan areas in Gauteng, KwaZulu-Natal and the Western Cape provinces, each with high commuter traffic volumes, recorded 88 per cent of the FWIs for the period 2010/11 to 2018/19.
- Passengers were not harmed in 64,72 per cent of the operational safety occurrences in 2018/19.
- The workforce is relatively safe - fewer than one workforce FWI occurred in 90 per cent of the operational safety occurrences, and a maximum fatality rate of two FWIs per occurrence was recorded. The data is limited to occurrences directly related to rail operations.
- FWI for the public remains higher, largely due to occurrence Category [E] – People struck by trains during movement of rolling stock.
- During 2018/19, the public was harm-free in only 16,47 per cent of these operational safety occurrences. Fewer than one public FWI occurred in 37,83 per cent of the operational safety occurrences, and one to two public FWIs occur in 44,21 per cent of the operational safety

occurrences.

- There was a 20 per cent overall increase in security-related incidents in the last year, part of a long-term 125 per cent increase since 2012/13 in the total number of security-related incidents.

The 2018/19 State of Safety Report examined, in greater detail, the safety performance of each of the high consequence occurrence categories to better understand their risk profiles and where possible, causal factors. A high-level overview of the main findings from these high consequence occurrence categories is provided below.

The first high consequence occurrence category presented in the report is detailed in the **Collisions** chapter. The chapter focusses on the safety risks related to “Collisions during movement of rolling stock” - SANS Occurrence Category A.

**Noteworthy statistics for 2018/19 include:**

- A total of 873 collisions were reported during 2018/19; a 15 per cent decrease compared to the previous reporting period.
- A total of 873 collisions were reported for the 2018/19 reporting period. More than 91 per cent of all collisions occur in Sub-category A-b - Collision of rolling stock with an obstruction on a running line (including road vehicles that collide with rolling stock). A total of 12 collisions between rolling stock were recorded for 2018/19; seven were recorded during 2017/18.
- Per million train km, operators recorded a 38 per cent rise in SANS Category A- Collisions between rolling stock on running line occurrences since 2010/11.
- TFR produced 20 per cent fewer train kilometres since 2010/11. On a normalised basis, TFR recorded an increase of 7 per cent collisions since 2010/11.
- PRASA produced 24 per cent fewer train kilometres since 2010/11. On a normalised basis, it recorded 20 per cent more collisions in 2018/19.
- More than 91 per cent of all collisions occur in Sub-category A-b - Collision of rolling stock with an obstruction on a running line (including road vehicles that collide with rolling stock).
- The Gauteng province was responsible for 88 per cent of all train collision harm since 2010/11.



- A staggering 27 per cent of all harm over the nine years since 2010/11 occurred in the 2018/19.

The **Derailments** chapter covered safety risks pertaining to derailments during movement of rolling stock on a running line and during tippler activities - SANS Occurrence Category B.

**Noteworthy statistics during 2018/19 include:**

- A total of 370 derailments were reported during 2018/19; 18 per cent decrease compared to the previous reporting period.
- Overall there was a 32 per cent decrease in derailments per million train km since 2010/11.
- Whereas the 2018/19 Financial Year witnessed an 18 per cent decrease in total train derailments when compared with the previous financial year. On a per million train km normalised basis, this represents an 8 per cent increase.
- Since 2010/11, the FWI value has decreased by 85 per cent.
- Since 2010/11, the Gauteng and KwaZulu-Natal provinces account for 56 per cent and 18 per cent respectively of the FWI harm to persons due to derailments.

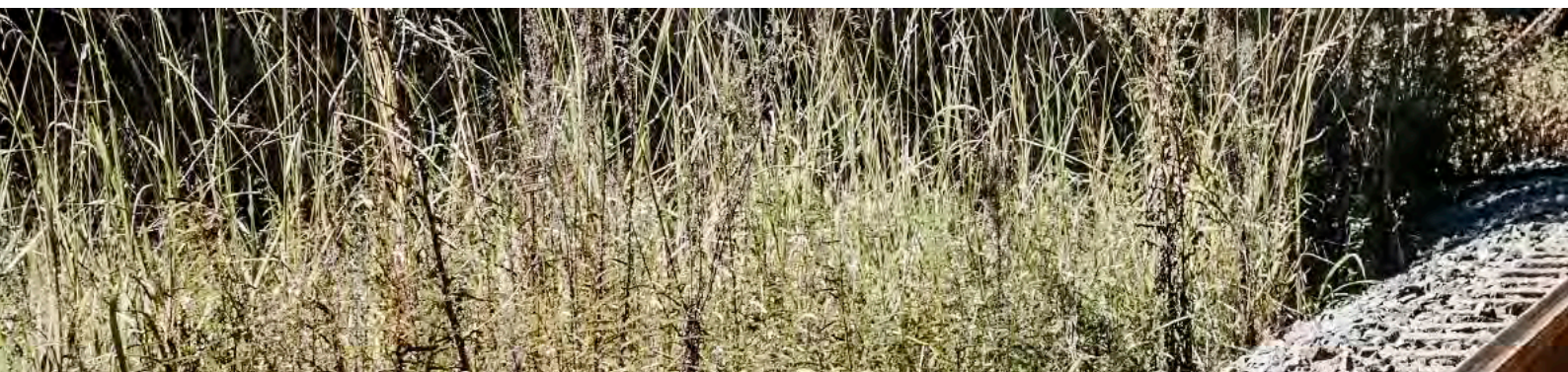
The **Level Crossings** chapter focusses on the risks arising from train accidents at level crossings, and examined the relationships between occurrence sub-categories and their respective consequences. Distinctions were made between train passengers, pedestrians and road vehicle users (i.e. the public) and workforce (train drivers and assistants) for the 2018/19 Financial Year to understand the risks borne by different road-rail user groups.

**Noteworthy statistics for 2018/19 include:**

- A total of 133 level crossing occurrences were reported during 2018/19; a 6 per cent increase compared to the previous reporting period.

- The North West, KwaZulu-Natal and Western Cape provinces accounted for 56 per cent of all level crossing occurrences in 2018/19.
- Level crossing occurrences decreased by 12,5 per cent overall since 2010/11.
- The number of level crossing occurrences for 2018/19 increased by 52 per cent over the 2015/16 (87 in total) low point.
- Level crossings occurrences per million train km increased by 69 per cent between 2014/15 and 2018/19. This upward trend is amplified as the largest operators, TFR and PRASA, produced fewer train km over the same period.
- Of the 25 fatalities at level crossings during the 2018/19 Financial Year, 22 (88 per cent) were road vehicle users and three (12 per cent) were pedestrians. There were no train passenger fatalities due to level crossing occurrences in 2018/19.
- Of the 75 injuries at level crossings during 2018/19, 70 (93 per cent) were road vehicle users, two (3 per cent) were train drivers/assistants and three (4 per cent) were pedestrians. There were no injuries to train passengers.
- The overall level of harm at level crossings in 2018/19 was 32,5 FWI harm, compared with 67,6 FWI harm for 2017/18 (the latter is distorted by the Geneva level crossing occurrence).
- Most level crossing risk in 2018/19 arose from road vehicle user behaviour.

The **People Struck by Trains** chapter examined the safety risks related to people struck by trains and excluded pedestrian level crossing occurrences where these are accounted for in the level crossings chapter. Inclusive in this occurrence category





were members of the public, railway employees and railway contractors.

**Noteworthy statistics for 2018/19 include:**

- A total of 519 people struck by train occurrences were reported during 2018/19; a 12 per cent decrease compared to the previous reporting period.
- While the number of people struck by trains occurrences reduced by 21 per cent and the calculated FWI count decreased by 18 per cent between 2010/11 and 2018/19, the FWI per million train km reduced only by 2 per cent.
- People struck by trains occurrences are lethal, with one fatality occurring daily on average since 2010/11. The FWI level on average is only 6 per cent higher than actual fatalities.
- Gauteng, Western Cape and the KwaZulu-Natal provinces recorded 88 per cent of the People Struck by Trains during movement of rolling stock occurrence category, in line with the long-term trend.
- The long-term average of harm is 5,5 FWIs per million train km.

The **Platform-Train Interchange** (PTI) chapter focused on those occurrences that occurred at the station / or on the platform as passengers and the workforce entrain and detrain stationary or moving trains.

**Noteworthy statistics for 2018/19 include:**

- While 2018/19 PTI occurrences reduced by 16 per cent (625 in total) compared to 2017/18 (744 in total), PTI occurrences contributed to 16 per cent of the overall recorded operational occurrences in 2018/19.
- PTI occurrences on average result in nine fatalities annually; and 97 per cent of PTIs result in injuries.
- PTI occurrences are a weekday, peak hour phenomenon

indicating possible overcrowding of stations as a major concern.

- The Gauteng province represents more than half of all the PTI occurrences, followed by KwaZulu-Natal and the Western Cape. The three large metropolitan areas represent 99 per cent of the 2018/19 PTI occurrences.
- PTI occurrences increased drastically by 54 per cent since 2010/11 on a normalised basis.
- PTI occurrences have increased by 30 per cent since 2010/11 based on total numbers .

The **Railway Security** chapter looked at the railway security incidents reported to the RSR by railway operators as well as the South African Police Services (SAPS). It examined the most prevalent security concerns and provided a geographical overview of the overall harm arising from security-related incidents. Due to the nature and format of reporting security incidents, neither risk analysis per rail user group nor risk profiles were calculated.

**Noteworthy statistics for 2018/19 include:**

- Security-related incidents increased by 20 per cent overall between 2017/18 and 2018/19.
- Compared over the long term since 2013/14, it is fair to state that 2018/19 levels of all security-related Incidents are out of control. An increase of 125 per cent was recorded based on total numbers.
- The overall harm to persons increased by 15 per cent since 2017/18.
- Theft and vandalism account for 88 per cent of all security-related incidents. The operational impact on train operations is significant and could be evidenced by the percentage time that TFR and PRASA operate at a degraded mode.







# CHAPTER 1

# Introduction

## Overview of the RSR

The primary legislative mandate of the RSR is to oversee and enforce safety performance by all railway operators in South Africa, including those of neighbouring States whose rail operations enter South Africa. The National Railway Safety Regulator Act No. 16 of 2002, as amended, states in Section 5 that the objects of the RSR are to:

- a) oversee the safety of railway transport while permit holders remain primarily responsible and accountable for ensuring the safety of their railway operations
- b) promote improved safety performance in the railway transport industry;
- c) develop any regulations that are required in terms of the Act;
- d) monitor and ensure compliance with the Act; and
- e) give effect to the objects of the Act.

The RSR regulates railway safety by issuing safety permits to railway operators on the basis of an established Safety Management System (SMS) that meets the requirements of the Act, and the SMS Determination. The SMS Determination stipulates the format, form and content of a safety management system that is required for the different categories and types of safety permits. A Safety Management System is a formal framework for integrating safety into day-to-day railway operations and includes safety goals and performance targets, risk assessment responsibilities and authorities, rules and procedures, monitoring and evaluation processes etc. The overall purpose of the SMS is to ensure that railway organisations achieve their business objectives in a safe manner.

The safety compliance activities undertaken by the RSR includes audits and inspections of railway operations, investigations of railway occurrences, development of an enabling regulatory framework, issuing operators with directives, notices of non-conformances and non-compliances. The Regulatory framework also empowers the RSR to impose penalties for non-compliance with the Act and safety standards. The RSR also provides awareness training to operators on the regulatory framework.

The RSR's rail safety assurance vision is "Zero Occurrences" and the mission statement is "to oversee and promote safe railway operations through appropriate support, monitoring and enforcement, guided by an enabling regulatory framework".

### Overview of the railway operators

In terms of section 22 of the Act, a person may not undertake any railway operations without being in possession of an applicable safety permit. The RSR, in terms of section 28(a) and (b) of the National Railway Safety Regulator Act, 2002 No. 16 of 2002, as amended published the determination of the format, form and content of a safety management system that is required for the different categories and types of safety permits. All operators are required to submit safety permit applications in compliance with the requirements as set out in the published document.

During the reporting period 258 safety permits were issued; Transnet Freight Rail (TFR) and the Passenger Rail Agency of South Africa (PRASA) are the two largest operators. The Bombela Operating Company (BOC), trading as Gautrain - the first standard gauge passenger operation in South Africa - commenced its operations in June 2010 and is a significant operator in for of commuter services in the Gauteng province. The remaining operators comprises tourism operators, cross border operators, surface operations on mines, rail operations in ports, municipal sidings, service lines and private siding operators in agricultural, manufacturing and petrochemical sectors.

The operators are classified according to the extent of their operations. Group-A Operators are railway organisations which transport 500 000 tons or more of general goods, 50 000 tons or more of dangerous goods, or passengers. Group-B Operators are those who transport between 200 000 tons and 500 000 tons of general goods and fewer than 50 000 tons of dangerous goods or tourists while Group C Operators transport fewer than 200 000 tons of general goods. The table below shows the number of permit holders per region and class for the 2018/19 Financial Year.

**Table 2: Permit holder groups per region – 2018/19**

Region	Permit Group				Grand Total
	A	B	C	T*	
Eastern Cape region	9	8	8	1	26
Gauteng region	24	17	29	0	70
KwaZulu-Natal region	20	9	26	0	55
Mpumalanga region	33	8	11	2	54
Western Cape region	15	22	15	1	53
<b>Grand Total</b>	<b>101</b>	<b>64</b>	<b>89</b>	<b>4</b>	<b>258</b>

\*: Temporary Safety Permits are issued only to currently active railway operators for operations not yet covered by an existing permit as an interim arrangement pending the application and issuing of a Group A, B or C Safety Permit

## Purpose of the report

The aim of the Annual State of Safety Report is to provide an assessment of the safety performance of the operators operating within the borders of South Africa and is primarily produced to fulfil the RSR’s mandate as required by the Act. The Act mandates the RSR to produce this report on an annual basis to inform all stakeholders of the safety of workers, the public and the environment associated with railway operations.

## Description of occurrences and incident data

In terms of section 37 of the Act, operators are legally required to report all occurrences and incidents to the RSR. This section stipulates that operators must report to the Chief Executive Officer the category and type of all railway occurrences in the manner and form prescribed by the Minister. The regulatory instrument adopted by the RSR for the types and categories of occurrences remains the National Standard on Safety Management Systems – SANS 3000-1. Table 3 provides an overview of the categories and descriptions of major operational occurrence and security-related incidents.

**Table 3: SANS 3000-1 description for operational occurrence and security-related incidents**

OPERATIONAL OCCURRENCES	
CATEGORY	DESCRIPTION
A	Collisions during movement of rolling stock
B	Derailments during movement of rolling stock
C	Unauthorised movements including rolling stock movements exceeding limit of authority
D	Level crossing occurrences
E	People struck by trains during movement of rolling stock
F	People-related occurrences: trains outside station platform areas or in section
G	Passenger-related occurrences: travelling outside designated area of train
H	People-related occurrences: platform-train interchange (colloquially known as PTIs or Platform-train interface)
I	People-related occurrences: station infrastructure
J	Electric shock
K	Spillage/leakage, explosion or loss of dangerous goods
L	Fires
SECURITY-RELATED INCIDENTS	
1	Theft of assets (impacting on operational safety)
2	Malicious damage (vandalism) to property
3	Threats (to operational safety)
4	Hijacking of trains
5	Crowd-related occurrences
6	Industrial action
7	Personal safety on trains
8	Personal safety at stations
9	Personal safety outside platform area (including yards, sidings and depots)

Furthermore, the RSR has established a National Railway Safety Information and Monitoring systems (NIMS); this was done in compliance with Section 39 of the Act. All railway safety data is captured and managed daily through NIMS. Additional safety performance reports are submitted to the RSR through suitable means in order to assure the integrity of the NIMS database. The South African Police Services (SAPS) through the Rapid Rail Police also provides data on harm and security-related incidents. Other reports are received from the members of the public through the RSR's Contact Centre, as well as occurrence data received directly from railway operators. All data used in this report has been verified by the RSR and signed-off by the reporting parties as a true reflection of the data. The analysis in this report is based on data from the 2010/11 Financial Year and includes events up to and including 31 March 2019.

## Report structure

The Safety Overview chapter which follows this introduction, it sets the context by analysing the railway occurrence and consequence (fatalities and injuries) data to identify and understand the safety performance of railway operations. It is followed by chapters on the established high consequence occurrence categories namely, Collisions; Derailments; Level Crossings; People Struck by Trains and Platform-Train Interchange occurrences. These chapters are in turn followed by an analysis chapter on all significant security-related incidents categories, while the last chapter provides specific details of the RSR's interventions embarked on during the reporting period.









# CHAPTER 2

# RAILWAY OPERATIONAL SAFETY AND SECURITY OVERVIEW

This chapter sets the context by analysing the railway occurrence and consequence (fatalities and injuries) data to identify and understand the safety performance in the railway transport industry. It makes use of time-series analyses of railway occurrences and consequences to provide an overview of the high-level trends and risk profiles in passenger, public and workforce safety performance.

## Noteworthy statistics for 2018/19 include:

- Transnet Freight Rail produced 37 million train km and 146 billion tonne km in 2018/19.
- PRASA (including Metrorail and Shosholoza Meyl) produced 20 million train km and 5,7 billion passenger km in 2018/19.
- In total, 13 767 negative events were reported to the RSR, as follows:
  - o Safety-related occurrences: 3 990;
  - o Security-related incidents: 9 268; and
  - o Uncategorized events including bodies dumped on the rail reserve: 509.

Note that the 9 268 security-related incidents increased from 7 737 in 2017/18, largely due to a 26 per cent increase in theft (SANS Category 1).

- Despite an overall 18 per cent reduction in network traffic since 2012/13, operator occurrences per million train km increased marginally by 14 per cent, but security-related incidents per million train km increased dramatically by 175 per cent.
- Since 2010/11, on average, 649 FWI resulted from operator occurrences, 60 per cent of these resulted from SANS Category E - People struck by trains during movement of rolling stock.
- The three large metropolitan areas in Gauteng, KwaZulu-Natal and the Western Cape provinces, each with high commuter traffic volumes, recorded 88 per cent of the FWIs.
- Passengers were not harmed in 64,7 per cent of the 2018/19 operational safety occurrences.
- The workforce is safe - fewer than one workforce FWI occurred in 90 per cent of the operational safety occurrences; and a maximum fatality rate of two FWIs per occurrence.
- FWI for the public remains higher, largely due to Occurrence Category [E] – People struck by trains during movement of rolling stock.
- The public was harm-free in only 16,5 per cent of these operational safety occurrences. Fewer than one public FWI occurred in 37,83 per cent of the operational safety occurrences, and one to two public FWIs occur in 44,2 per cent of the operational safety occurrences.
- There was a 20 per cent overall increase in security-related incidents in the last year, part of a long-term 125 per cent increase since 2012/13.
- Since 2012/13, there was a 175 per cent increase in the overall number of security-related incidents per million train km.

# Operations overview

Table 4: TFR and PRASA Rail traffic volumes and productivity for 2010/11 – 2018/19

OPERATOR	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19
<b>Transnet Freight Rail (TFR)</b>									
Million train km	46	46	46	47	47	39	39	40	37
Billion tonne km	117,90	126,50	132,40	134,60	144,70	138,40	143,46	151,53	145,99
<b>Passenger Rail Agency of South Africa (PRASA), based on fare collections only (excludes fare evasions)</b>									
Million train km	26,30	19,90	24,53	24,97	23,90	22,20	21,40	20,30	20,10
Million passenger km	12 232	13 651	16 735	14 269	13 670	11 854	9 872	7 279	5 720

Table 4 and Figures 1 to 3 provides details of the traffic volumes and productivity levels for the period 2010/11 - 2018/19, as submitted to the RSR by the two major operators, namely TFR and PRASA. When examining the annual train kilometres per operator from 2010/11 to 2018/19, interesting trends for each of the operators are revealed.

For Transnet, South Africa’s major freight operator, Table 4 indicates a 20 per cent decrease in train km since 2010/11 from more than 45 million train km to 37 million train km in 2018/19. Even though a minor increase in train kilometres was reported for the 2010/11 – 2014/15 period and again for 2016/17 – 2017/18, with a sharp decrease in activity in 2015/16, the overall performance is still below the initial 46 million train km recorded in 2010/11. In comparison, however, a 24 per cent increase in tonne km shows the same decrease as train km since 2017/18 after an increase between 2016/17 and 2017/18.

For PRASA since 2010/11, Table 4 reflects a 24 per cent decrease in train km and 53 per cent decrease in passenger km. Figure 3 shows the 2018/19 regional productivity of PRASA’s mass transit (Metrorail) and Shosholoza Meyl long-distance mainline passenger services.

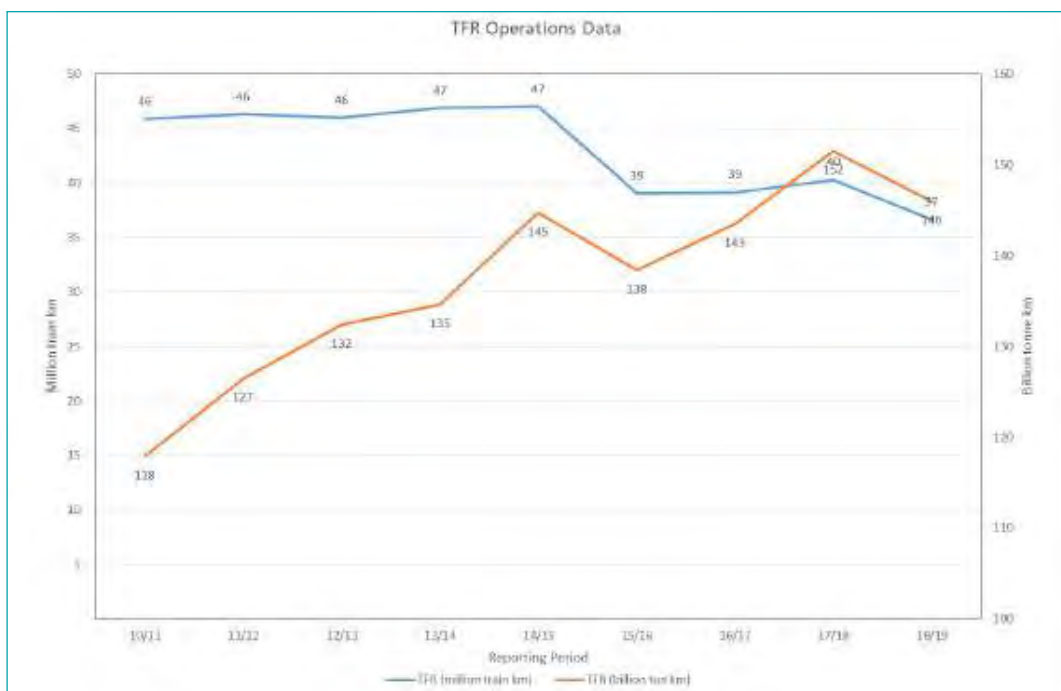


Figure 1: TFR operations data



Figure 2: PRASA operations data

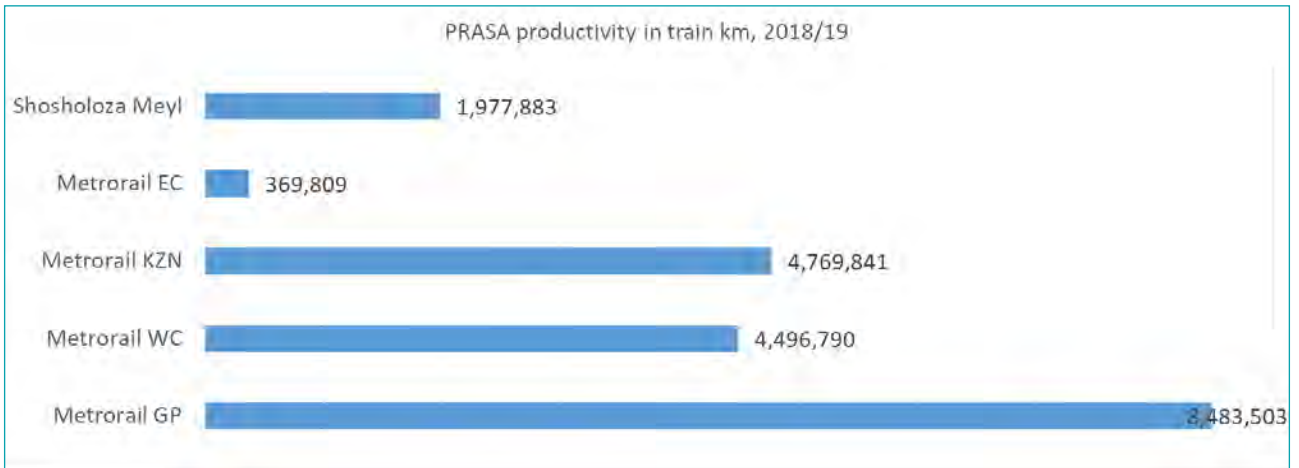


Figure 3: PRASA productivity in train km

## Safety performance overview

Railway occurrence data is classified into two broad categories, namely operational occurrences and security-related incidents as contained in SANS 3000-1 (2009). In terms of the Act, operational occurrences fall within the ambit of the RSR's oversight activities. The Act also instructs the RSR to play a supporting and advocacy role regarding security-related incidents. In this regard, the RSR monitors and supports the efforts of other organs of state, such as the South African Police Services and the Department of Labour, that share concurrent jurisdiction and mutual interests in addressing railway safety.

SANS 3000-1 (2009) stipulates the minimum requirements for the reporting of operational occurrences and security-related incidents. The Standard defines and classifies occurrences into categories to be used by railway operators when reporting occurrences to the RSR. These categories are further sub-divided into sub-categories for purposes of more detailed data analysis. Operational occurrences are captured in 12 major categories [A-L] and security-related incidents into nine categories.

Table 5 provides an overview of the major operational occurrence and security-related incidents. A detailed listing is presented in the Appendix on page 104; it can also be found in SANS 3000-1 (2009) version 2, clauses 7.2 and 10.2 respectively.



**Table 5: SANS 3000-1 description for operational occurrence and security-related incidents**

<b>OPERATIONAL OCCURRENCES</b>	
<b>CATEGORY</b>	<b>DESCRIPTION</b>
A	Collisions during movement of rolling stock
B	Derailments during movement of rolling stock
C	Unauthorised movements including rolling stock movements exceeding limit of authority
D	Level crossing occurrences
E	People struck by trains during movement of rolling stock
F	People-related occurrences: trains outside station platform areas or in section
G	Passenger-related occurrences: travelling outside designated area of train
H	People-related occurrences: platform-train interchange (colloquially known as PTIs or Platform-train interface)
I	People-related occurrences: station infrastructure
J	Electric shock
K	Spillage/leakage, explosion or loss of dangerous goods
L	Fires
<b>SECURITY-RELATED INCIDENTS</b>	
1	Theft of assets (impacting on operational safety)
2	Malicious damage (vandalism) to property
3	Threats (to operational safety)
4	Hijacking of trains
5	Crowd-related occurrences
6	Industrial action
7	Personal safety on trains
8	Personal safety at stations
9	Personal safety outside platform area (including yards, sidings and depots)

Figure 4 shows that, while in the following six years since 2012/13 there was an overall 20 per cent reduction in network traffic, operator occurrences per million train km increased marginally to 65,17 (14 per cent increase) and security-related incidents per million train km increased dramatically to 151,39 (175 per cent increase).

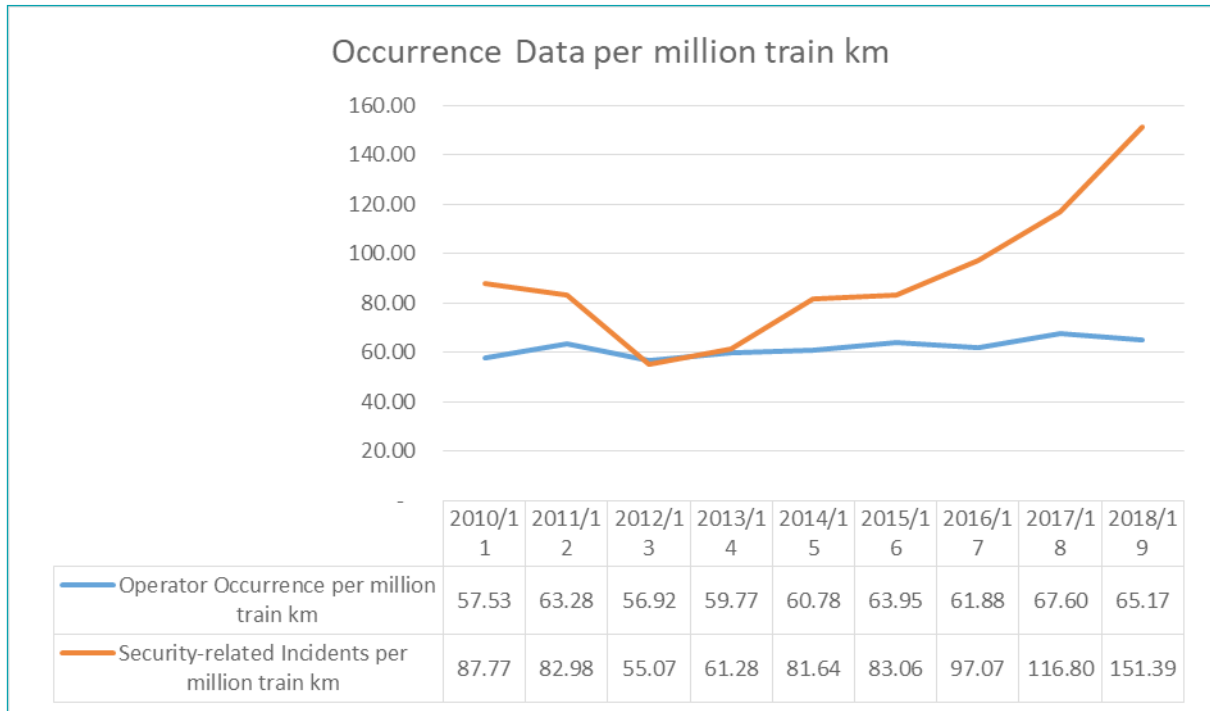


Figure 4: Occurrence data per million train km for the reporting period

TFR and PRASA are the dominant operators in South Africa and consistently record the highest number of occurrences annually (Figure 5).

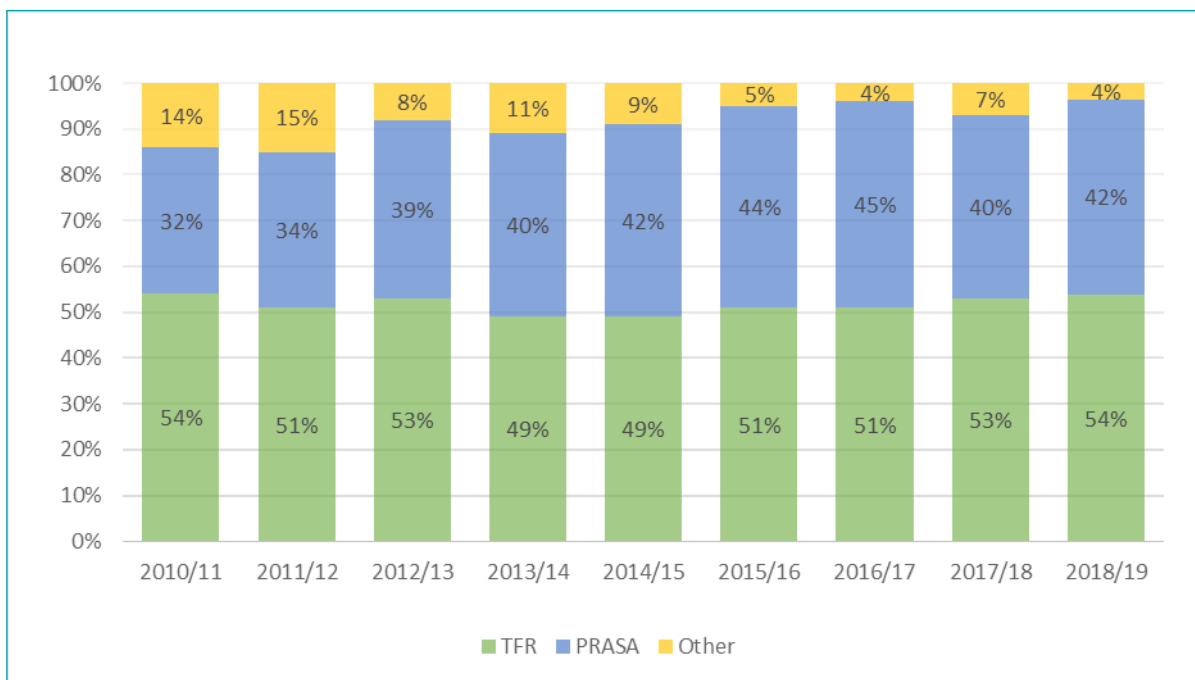


Figure 5: Distribution of safety occurrences for the reporting period 2010/11 to 2018/19

Safety occurrences by province are dominated by the three large Metrorail networks in Gauteng, KwaZulu-Natal and the Western Cape.

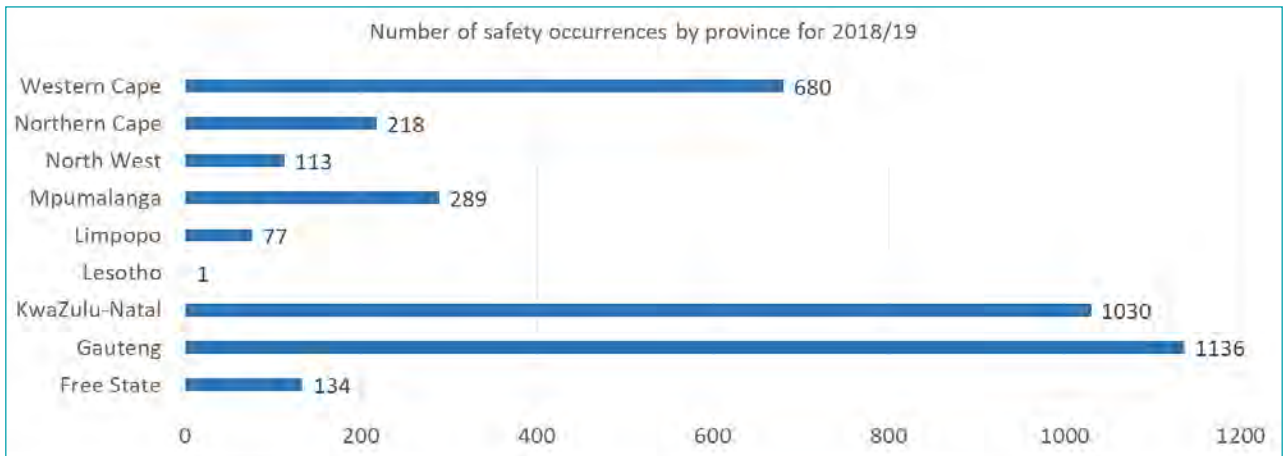


Figure 6: Safety occurrences by province





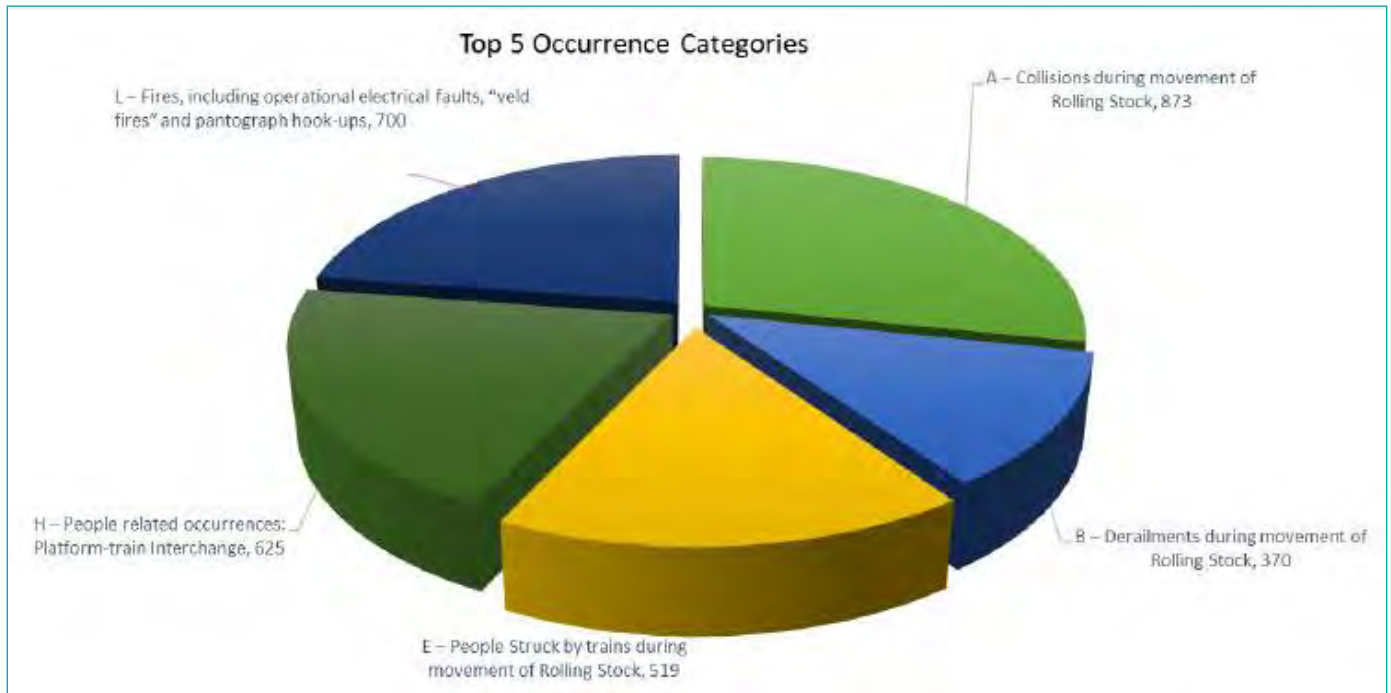
Table 6: Overview of operational safety occurrences for 2013/14 – 2018/19

Reporting Year	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19				
South African National Standards (SANS) Category	All	All	All	All	All	TFR	PRASA	Other	All	Trend
A: Collisions during movement of rolling stock	980	1059	1100	1006	1027	794	56	23	873	-15% ↓
B: Derailments during movement of rolling stock	718	592	420	386	450	232	48	90	370	-18% ↓
C: Unauthorised movements including rolling stock movements exceeding limit of authority	121	93	94	84	95	55	54	18	127	34% ↑
D: Level crossing occurrences	119	109	87	119	126	104	21	8	133	6% ↑
E: People struck by trains during movement of rolling stock	588	643	541	651	588	177	338	4	519	-12% ↓
F: People-related occurrences: trains outside station platform areas or in section	209	338	337	325	169	0	165	0	165	-2% ↓
G: Passenger-related occurrences: travelling outside designated area of train	94	163	131	140	160	0	169	0	169	6% ↑
H: People related occurrences: platform-train interchange/ interface	715	612	658	573	744	0	625	0	625	-16% ↓
I: People related occurrences: station infrastructure	190	166	130	111	116	0	110	0	110	-5% ↓
J: Electric shock	35	34	27	30	46	17	28	0	45	-2% ↓
K: Spillage/leakage, explosion or loss of dangerous goods	250	265	223	209	212	153	0	1	154	-27% ↓
L: Fires	568	558.00	502	432	745	621	79	0	700	-6% ↓
<b>TOTAL</b>	<b>4587</b>	<b>4632</b>	<b>4250</b>	<b>4066</b>	<b>4478</b>	<b>2153</b>	<b>1693</b>	<b>144</b>	<b>3990</b>	<b>-11%</b>

As seen in Table 6, only unauthorised movements including rolling stock movements exceeding the limit of authority, level crossing occurrences and passenger-related occurrences: travelling outside the designated area of a train increased in occurrence numbers compared to 2017/18 and also recorded the highest values since 2013/14.

Overall, there was an 11 per cent decrease in operational occurrences in 2018/19 compared to 2017/18.

Figure 7 shows the Top 5 categories for safety occurrences for 2018/19.



**Figure 7: Top 5 occurrence categories for 2018/19**

Figure 8 shows the data for the RSR’s strategic focus areas since 2013/14. Figure 9 shows the Fatalities and Weighted Injury (FWI) index for all occurrence categories since 2010/11. Figure 10 shows the FWI breakdown for 2018/19.

Table 7 shows that, annually, on average, some 649 equivalent deaths resulted from operator occurrences. A total of 60 per cent resulted from Category E - People struck by trains during movement of rolling stock.

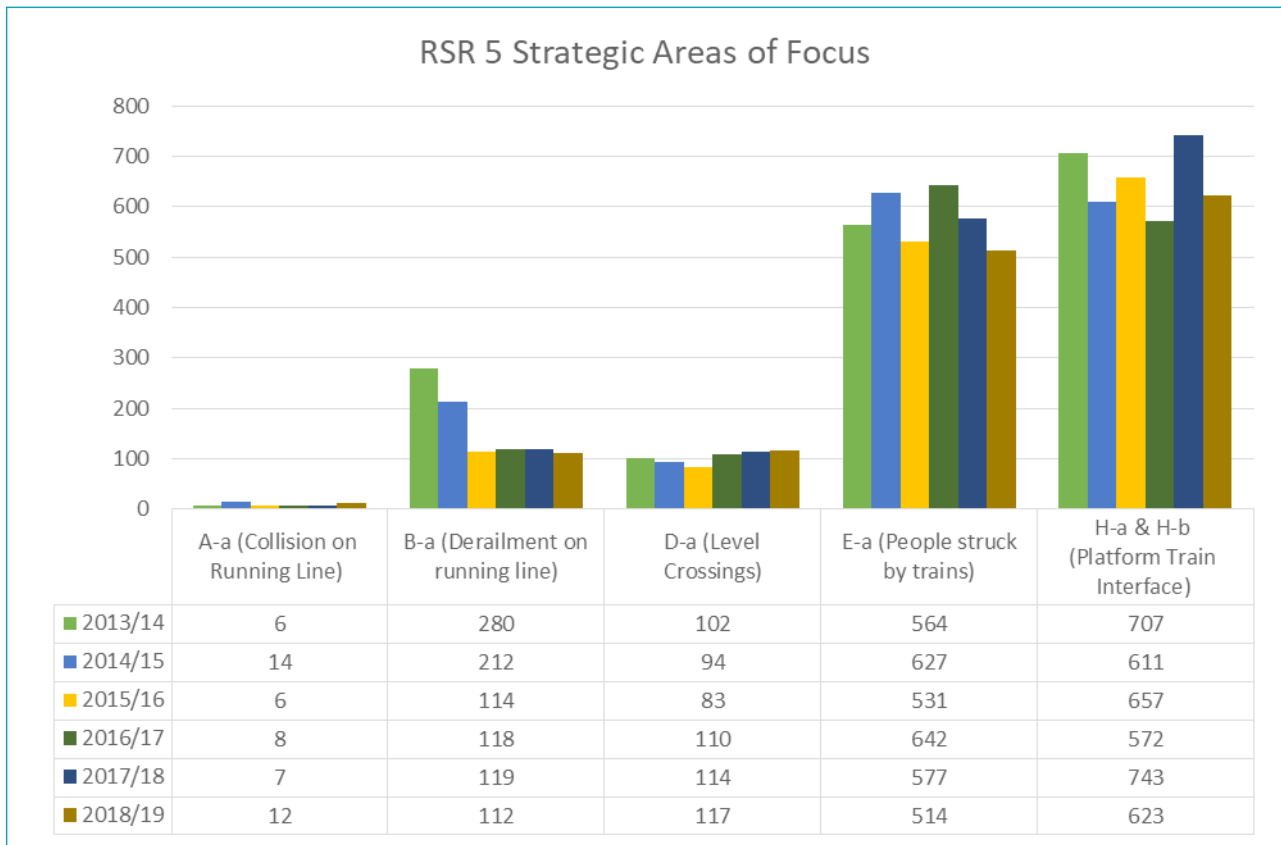


Figure 8: Number of occurrences - RSR Top 5 strategic focus areas since 2013/14

Occ.	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	Total
A	20,4	118,2	42	2,7	15,7	83,9	64,9	41,2	130,6	519,6
B	13,1	4,3	2,2	1,4	1,2	2,6	4,3	7,2	3,9	40,2
C	0	0	0	0	0	0,1	0	0	0	0,1
D	57,4	17,8	45,3	24,6	23,8	8,7	13,2	67,6	32,5	290,9
E	383,9	372,3	378,1	414,1	435	388	438	367,4	306,3	3483,1
F	8,8	13,6	7,7	23,4	34	44,6	48,5	33,2	22,4	236,2
G	19,8	15	29,6	24	34,4	28,8	32,1	39	33,6	256,3
H	77,8	97,7	93,3	75,9	64,9	75,1	66,5	77,7	69,5	698,4
I	12,4	6,5	7,6	18,3	15,6	12,6	12,4	11,3	11,7	108,4
J	11,8	14,6	8,8	17,5	17	19,9	19,7	25,4	28,1	162,8
K	0	0	0	0	2,9	0	0,1	0	1	4
L	5	3	4,1	3,9	3,1	17,7	3,2	0,7	1,4	42,1
<b>Total</b>	<b>610,4</b>	<b>663</b>	<b>618,7</b>	<b>605,8</b>	<b>647,6</b>	<b>682</b>	<b>702,9</b>	<b>670,7</b>	<b>641</b>	<b>5842,1</b>

Table 7: Fatality and weighted injury (FWI) index for all safety occurrence categories

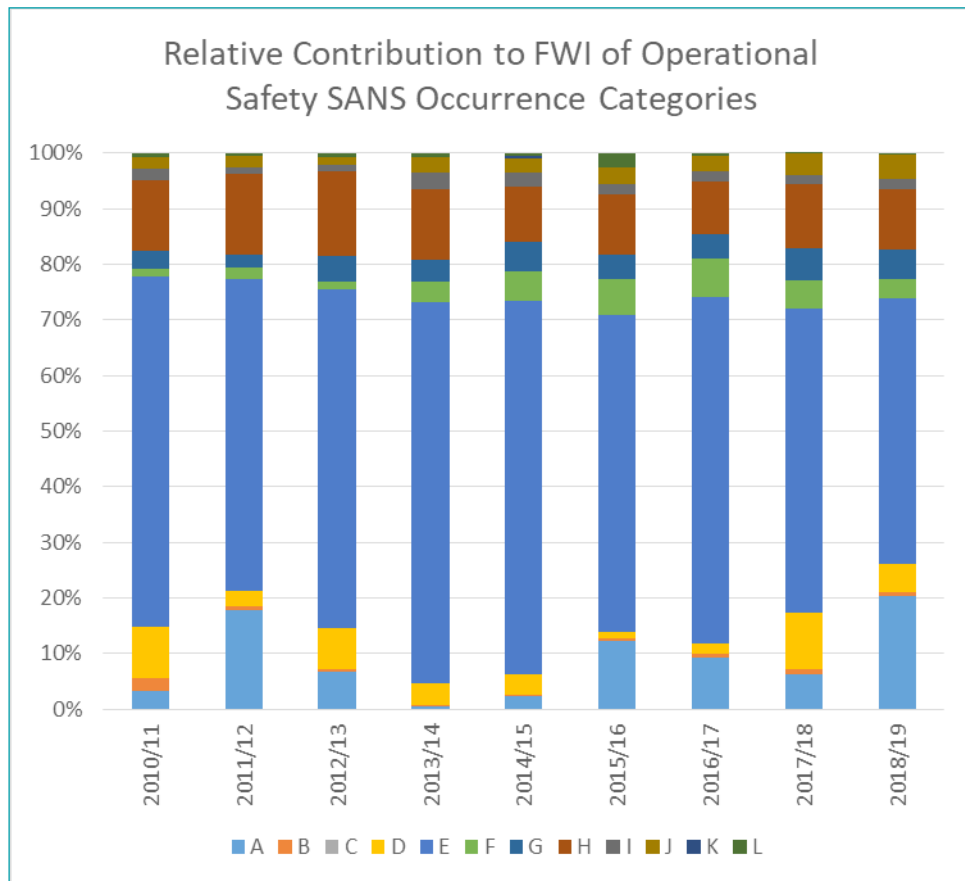


Figure 9: Relative Contribution to FWI of Operational Safety Occurrence Categories

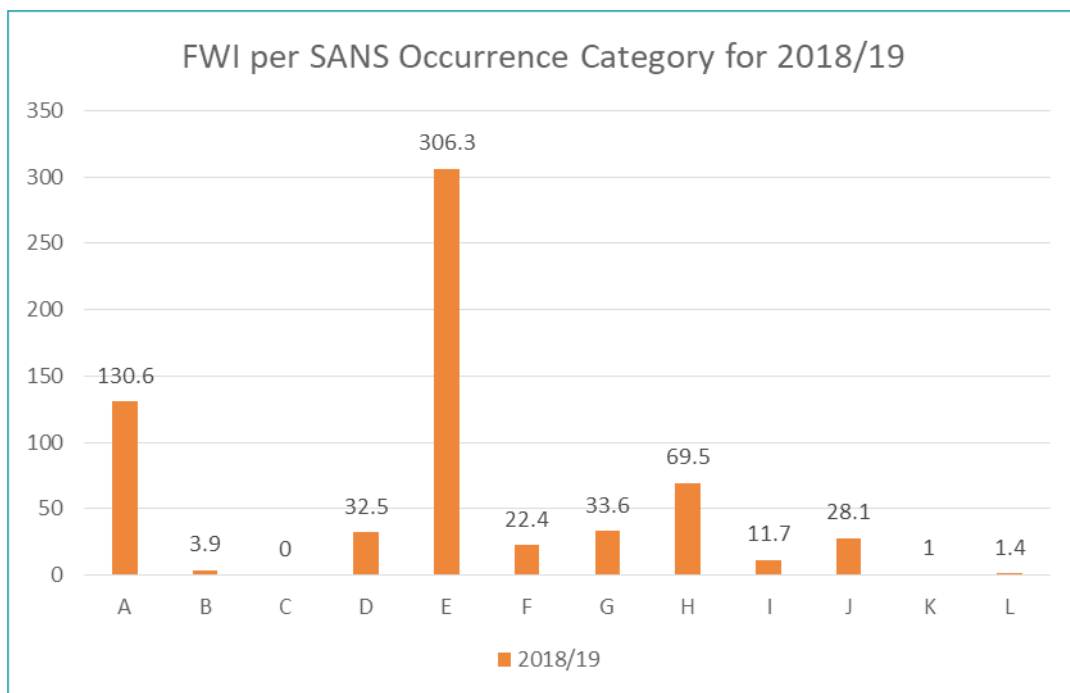


Figure 10: FWI for each SANS category for 2018/19

Figure 11 illustrates how the FWIs for all the operational safety SANS occurrence categories vary per geographical location. The three large metropolitan cities in the Gauteng, KwaZulu-Natal and the Western Cape provinces, with high commuter traffic volumes, recorded 88 per cent of the FWIs. Figure 12 illustrates PRASA's productivity levels in the same provinces.

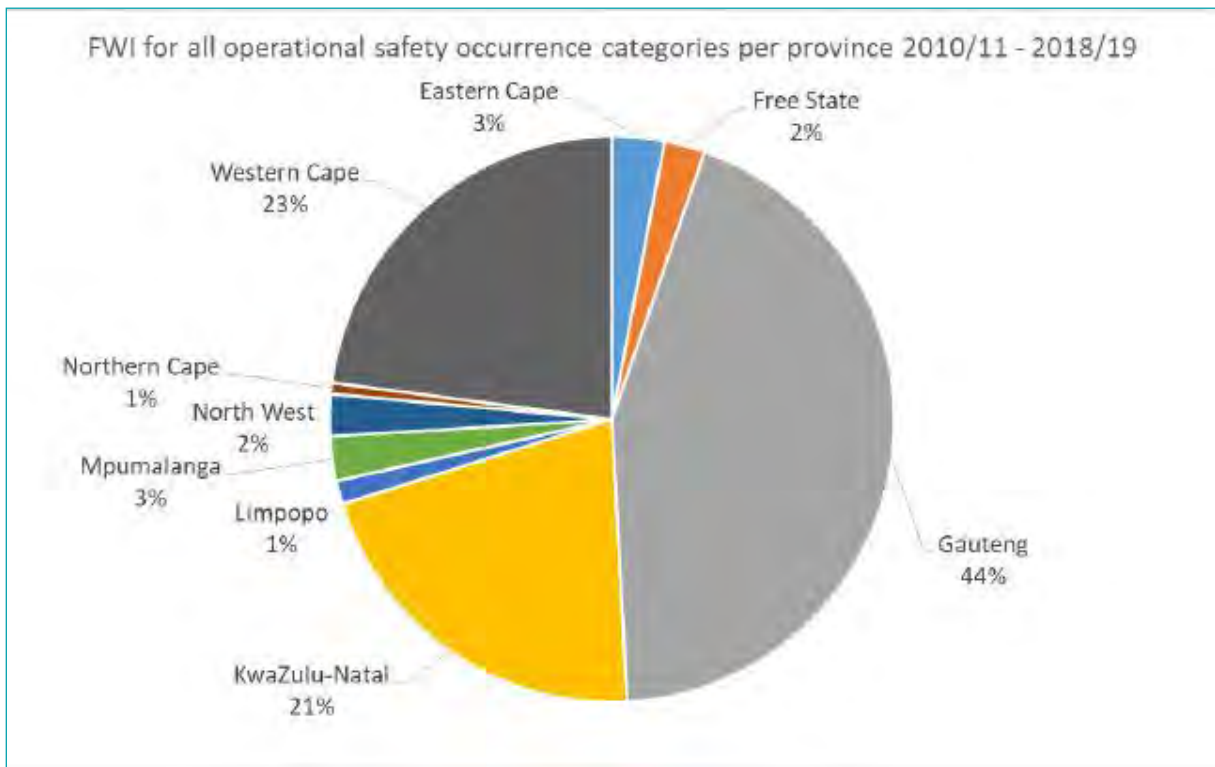


Figure 11: FWI for all safety occurrence categories per province 2010/11 - 2018/19

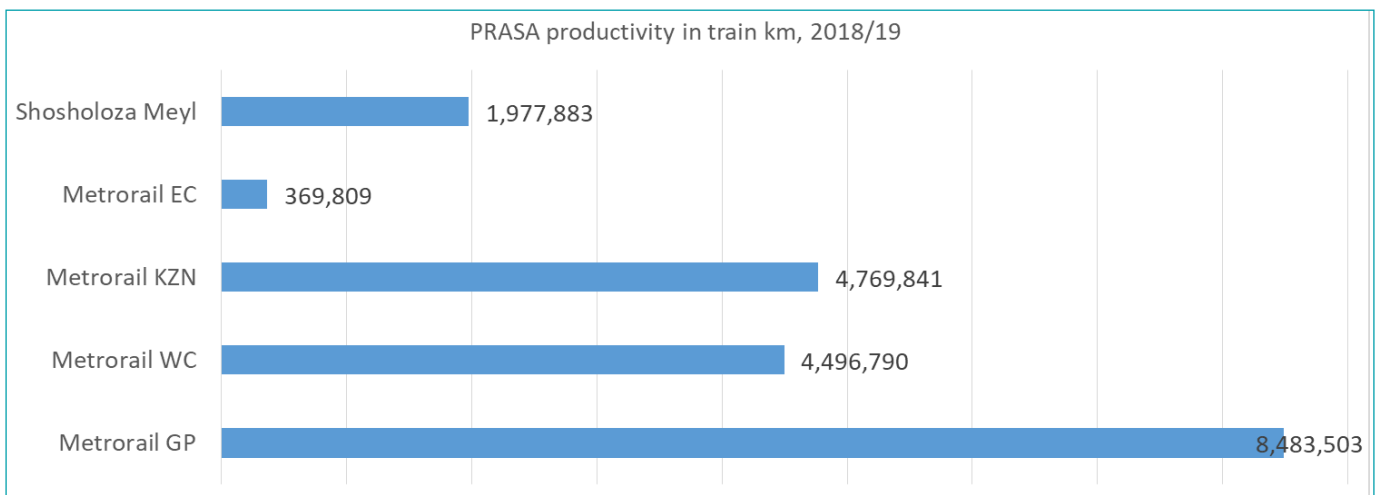


Figure 12: PRASA productivity in million train km - 2018/19

## Persons affected by operational safety occurrences

Figure 13 shows the FWI for the 2010/11-2018/19 Financial Years. A near-perfect curve fit and a simple linear trend are also shown. Based on historical performance, unfewer significant interventions take place, the FWI for 2019/20 would increase to just above the 2017/18 level and could escalate out of control.



Figure 13: FWI trend for 2010/11 - 2018/19

Figure 14 shows a marked increase in harm to passengers and a reduction in harm to the general public since the 2015/16 Financial Year.

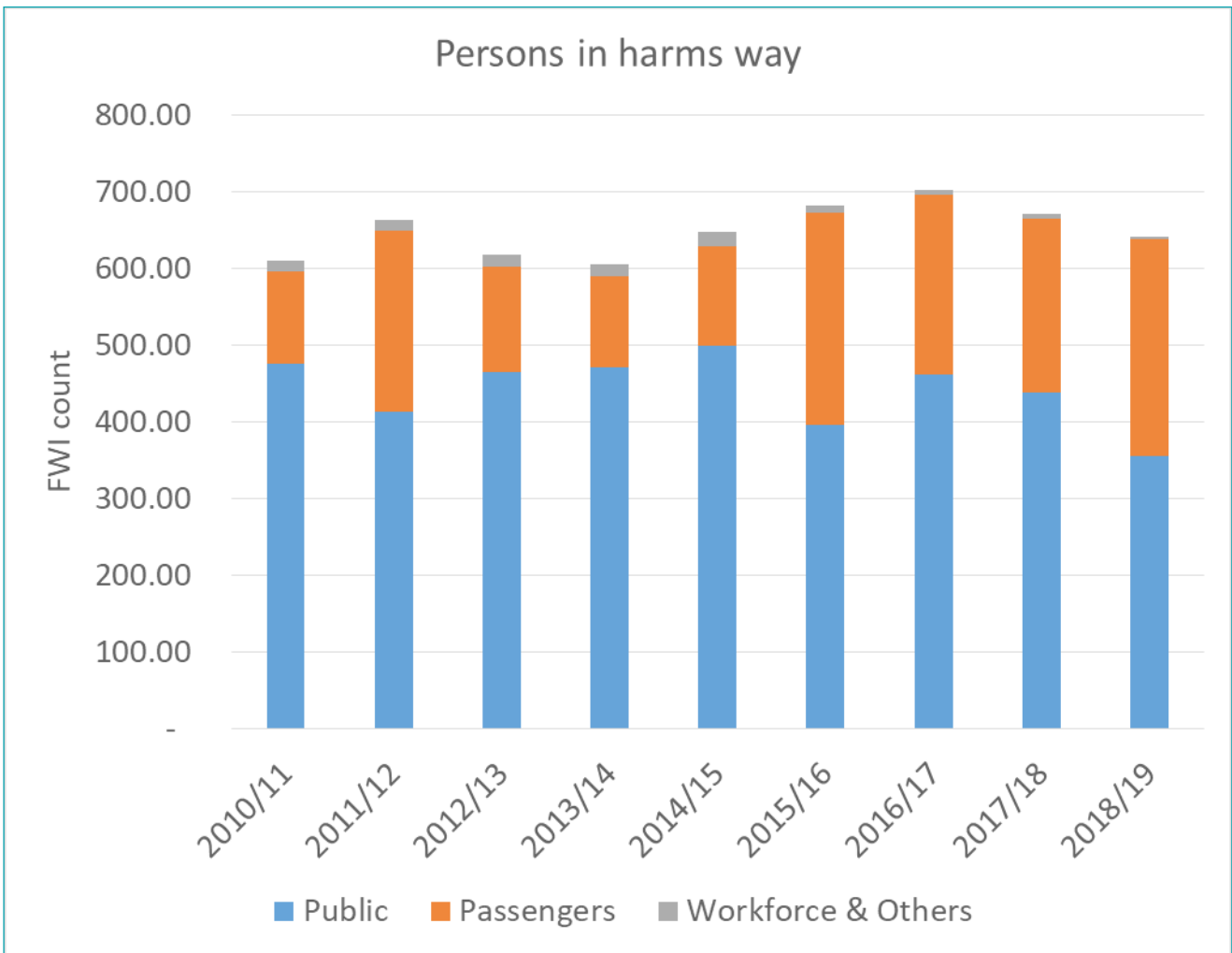


Figure 14: Persons in harm’s way 2010/11 to 2018/19

## Safety of passengers <sup>1</sup>

Approximately 5 720 million passenger kilometres were recorded for 2018/19. Figure 15 illustrates that passengers account for 30 per cent of FWIs for the 2010/11-2018/19 reporting period. An increasing trend in passenger FWIs can be observed for this period.

<sup>1</sup> The following SANS 3000-1, 2009 occurrence reporting categories were used to identify passenger harm: [A], [B], [F-a], [G], [H-a], [H-b], [I-b], [J-d] and [L]



Figure 15: FWI for 2010/11 - 2018/19

Of all the persons harmed (641 FWIs) as a result of operational safety occurrences in 2018/19, 46 per cent (283,7 FWIs) were passengers. Figure 16 illustrates the risk profile for passengers for the reporting period 2010/11 to 2018/19.

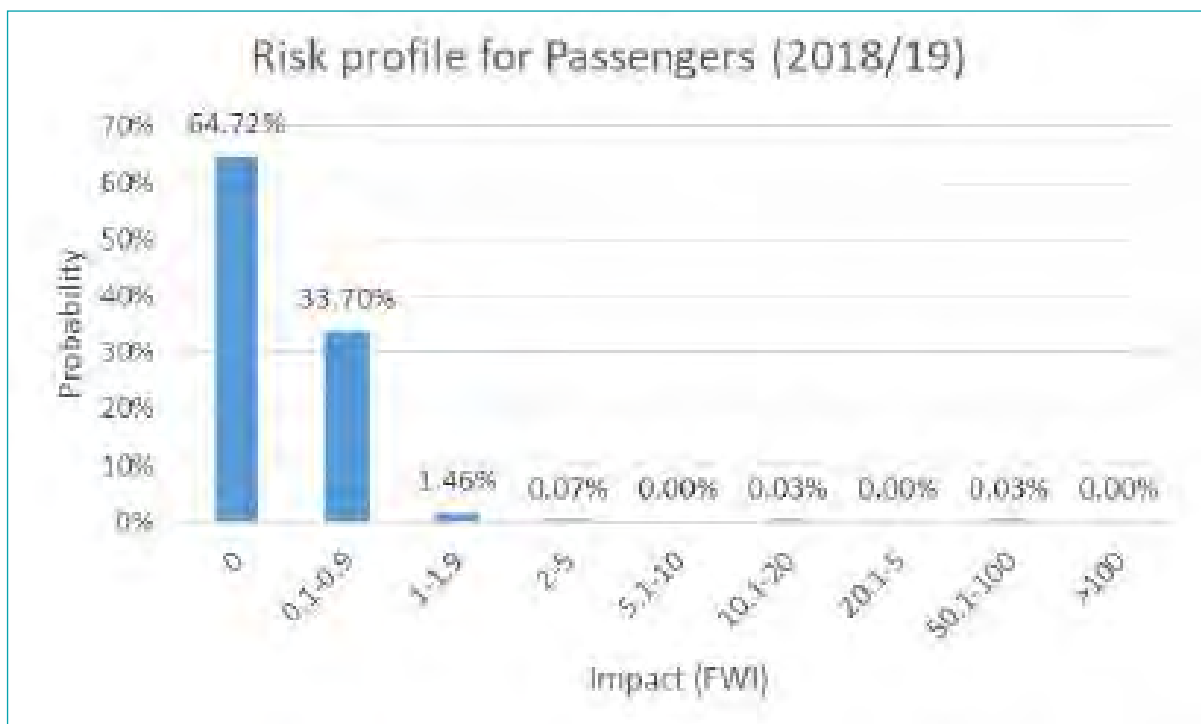


Figure 16: Risk profile for passengers (2018/19)



The risk profile for passengers (2018/19) show that once passenger-related operational occurrence happens, based on a Fatalities and Weighted Injuries index basis:

- Passengers were harm-free in 64,72 per cent of these operational safety occurrences;
- Fewer than one passenger FWI occurred in 33,7 per cent of the operational safety occurrences;
- Between 1 and 1,9 Passenger FWIs occurred in 1,46 per cent of the operational safety occurrences; and
- Operational occurrences associated with more than two passenger FWIs have a probability of roughly 0,12 per cent.

## Safety of the workforce<sup>2</sup>

From an operational occurrence perspective, the railway operators in South Africa ensure a safe working environment for employees and contractors. Figure 17 illustrates the calculation for workforce FWIs for the 2010/11-2018/19 reporting period. The lowest FWI values for workforce harm were recorded in 2017/18 and 2018/19. Of all (641 FWIs) persons harmed as a result of operational safety occurrences, only 0,14 per cent (0,9) FWIs were suffered by employees and contractors.

The risk profile for workforce (employees and contractors) (2018/19) in Figure 18 show that once workforce-related operational occurrence happens, based on a Fatalities and Weighted Injuries index basis:

- The Workforce was harm-free in only 10 per cent of these operational safety occurrences;
- Fewer than one workforce FWI occurred in 90 per cent of the operational safety occurrences;
- Operational occurrences associated with more than two workforce Fatalities and Weighted Injuries have a probability of zero.

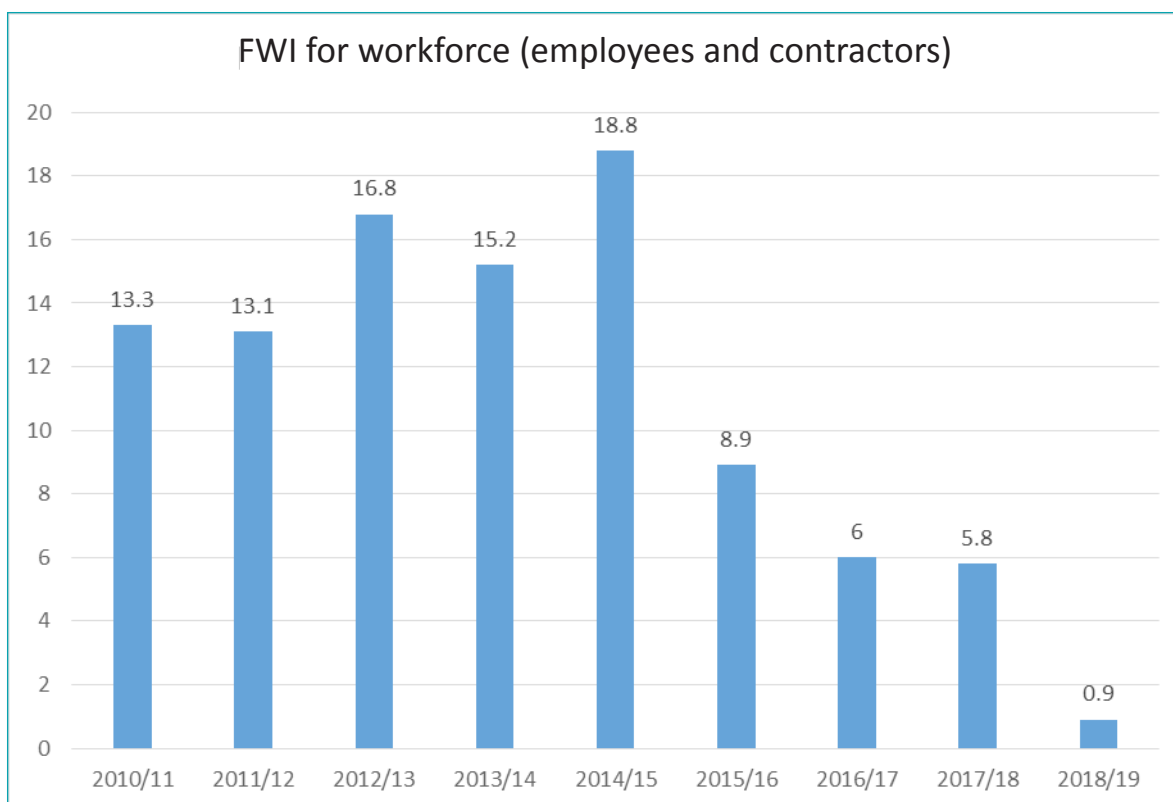


Figure 17: Workforce FWIs for 2010/11 - 2018/19

<sup>2</sup> The following SANS 3000-1, 2009 occurrence reporting categories were used to identify workforce harm: [E-b], [E-c], [E-e], [E-f], [F-b], [F-c], [H-c], [H-d], [H-e], [H-f], [I-c], [I-d], [I-e], [I-f], [J-b], [J-c], [J-e], [J-f], [J-h], [J-i], [J-k] and [J-l]

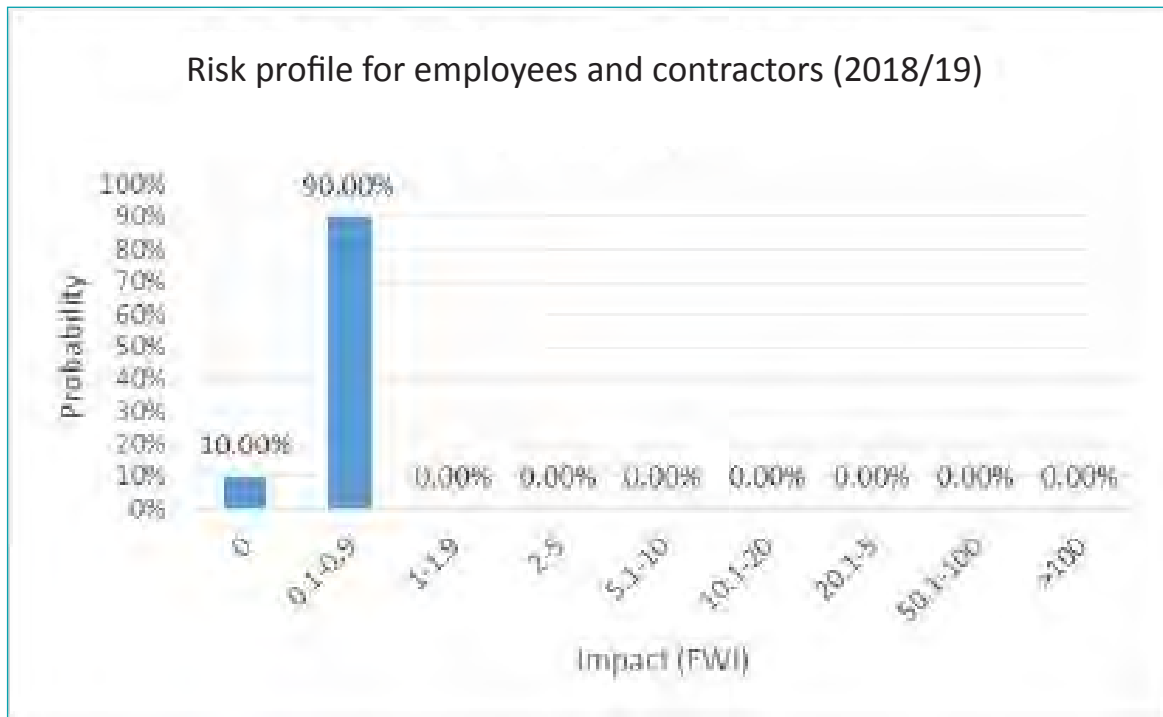


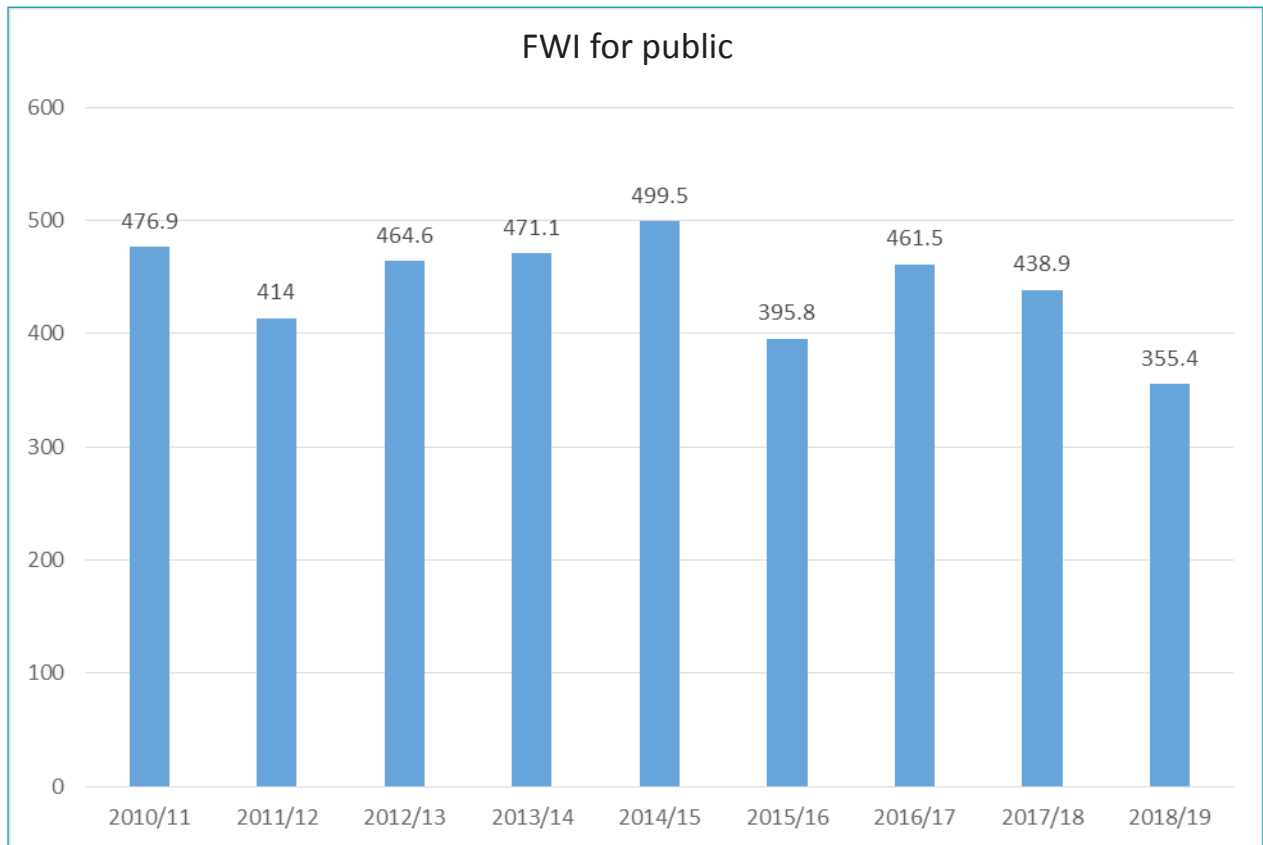
Figure 18: Risk profile for the workforce (employees and contractors) (2018/19)

### Safety of the public <sup>3</sup>

In contrast to the workforce, FWI for the public remains higher, largely due to Occurrence Category [E] – People struck by trains during movement of rolling stock.

From an operational occurrence perspective, the railway operators do not ensure a safe environment for the public when entering their premises. Figure 19 illustrates the calculation for public FWIs for the 2010/11-2018/19 reporting period. The 2014/15 – 2018/19 period recorded the two highest public FWIs values for the 2010/11-2018/19 reporting period.

<sup>3</sup> The following SANS 3000-1, 2009 occurrence reporting categories were used to identify public harm: [D], [E-a], [E-d], [I-a], [J-a], [J-g] and [J-j]



**Figure 19: Public FWIs for 2010/11 - 2018/19**

Of all (641 FWIs) persons harmed as a result of operational safety occurrences, 57 per cent (355,4 FWIs) were suffered by the public.

The risk profile for the public (2018/19) in Figure 20 shows that once public-related operational occurrence happens, based on a Fatalities and Weighted Injuries index basis:

- The public was harm free in only 16,47 per cent of these operational safety occurrences;
- Fewer than one public FWI occurred in 37,83 per cent of the operational safety occurrences;
- Operational occurrences associated with one to two public FWIs have a probability of 44,21 per cent.
- Operational occurrences associated with more than two public FWIs have a low probability (1,49 per cent).



Figure 20: Risk profile for the general public (2018/19)

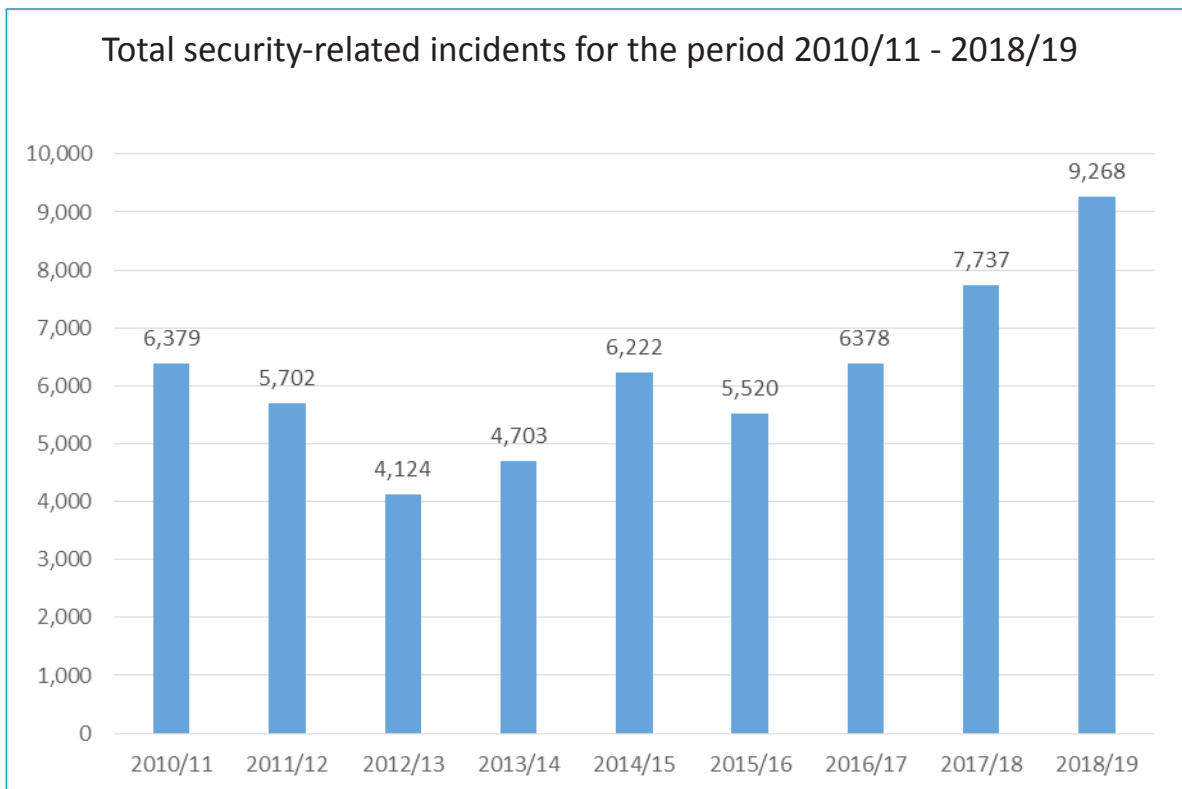
## Security performance

The National Railway Safety Regulator Act, No. 16 of 2002, as amended, acknowledges that safety and security matters are interconnected and that the Regulator plays a supporting role in railway security. Risk profiles and FWI values for passenger, workforce and public harm have not been calculated for this sub-section as they do not provide any further insights into the nature and severity of the security-related incidents reported to the RSR.

Table 8 shows a 20 per cent overall increase in security-related incidents between 2017/18 and 2018/19. Figure 21 shows a 125 per cent increase in the number of security-related incidents between 2012/13 and 2018/19. Note that Figure 4 earlier confirmed a 175 per cent increase in the number of security-related incidents per million train km for the same period.

**Table 8: Security-related incidents per SANS category**

Reporting year	2015/16	2016/17	2017/18	2018/19				
(SANS) Category	All	All	All	TFR	PRASA	Other	All	Trend
1: Theft of assets	3600	4379	4984	3645	2624	22	6291	21%
2: Malicious damage (vandalism)	1158	1162	1717	708	1028	74	1810	5%
3: Threats of operational safety	2	0	75	62	4	0	66	-14%
4: Train kidnapping or hijacking	0	0	0	0	0	0	0	-
5: Crowd-related occurrences	0	0	13	35	0	0	35	63%
6: Industrial action	1	8	25	26	8	1	35	29%
7: Personal safety on trains	368	408	398	4	455	2	461	14%
8: Personal safety on stations	305	312	401	19	395	15	429	7%
9: Personal safety outside station platform area	86	109	124	27	113	1	141	12%
<b>TOTAL</b>	<b>5520</b>	<b>6378</b>	<b>7737</b>	<b>4526</b>	<b>4627</b>	<b>115</b>	<b>9268</b>	<b>20%</b>



**Figure 21: Total number of security-related incidents reported by all operators for the 2010/11 to 2018/19 reporting period**

Figure 22 shows that while theft and vandalism account for 87,4 per cent of all security-related incidents, 9,6 per cent pertain to personal safety on trains and stations.

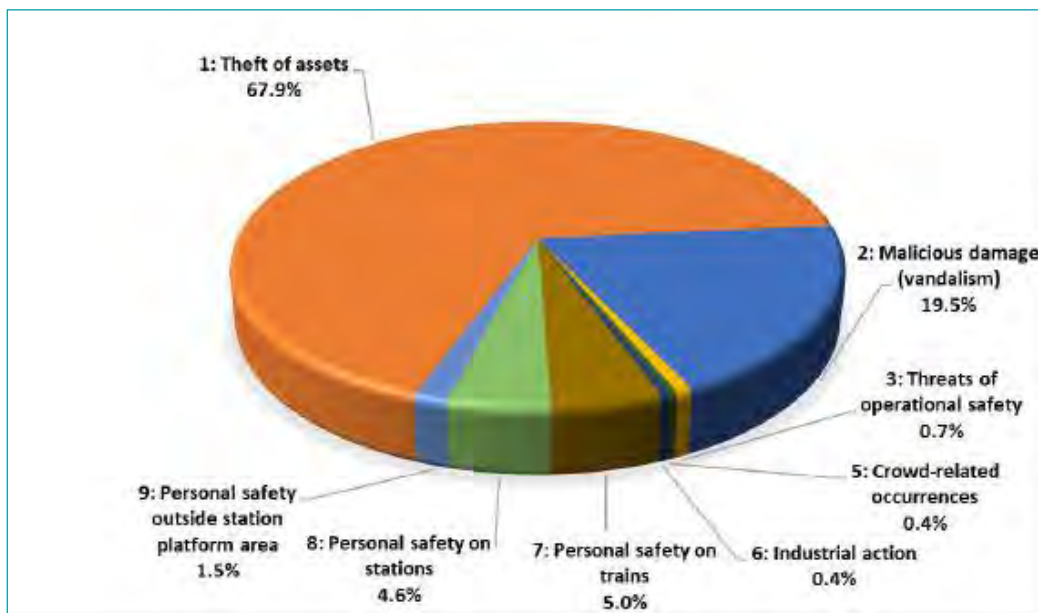


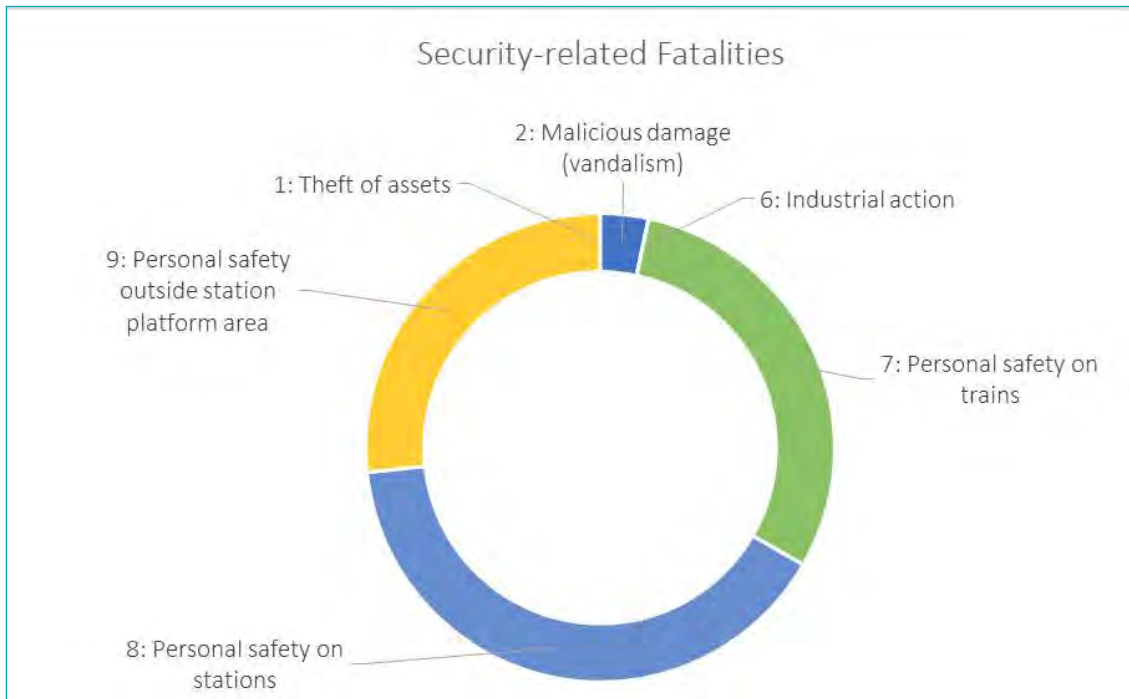
Figure 22: Percentage of security-related incidents per SANS category for 2018/19

Figure 23 shows only a 2 per cent difference in the number of security-related incidents between TFR and PRASA for 2018/19.

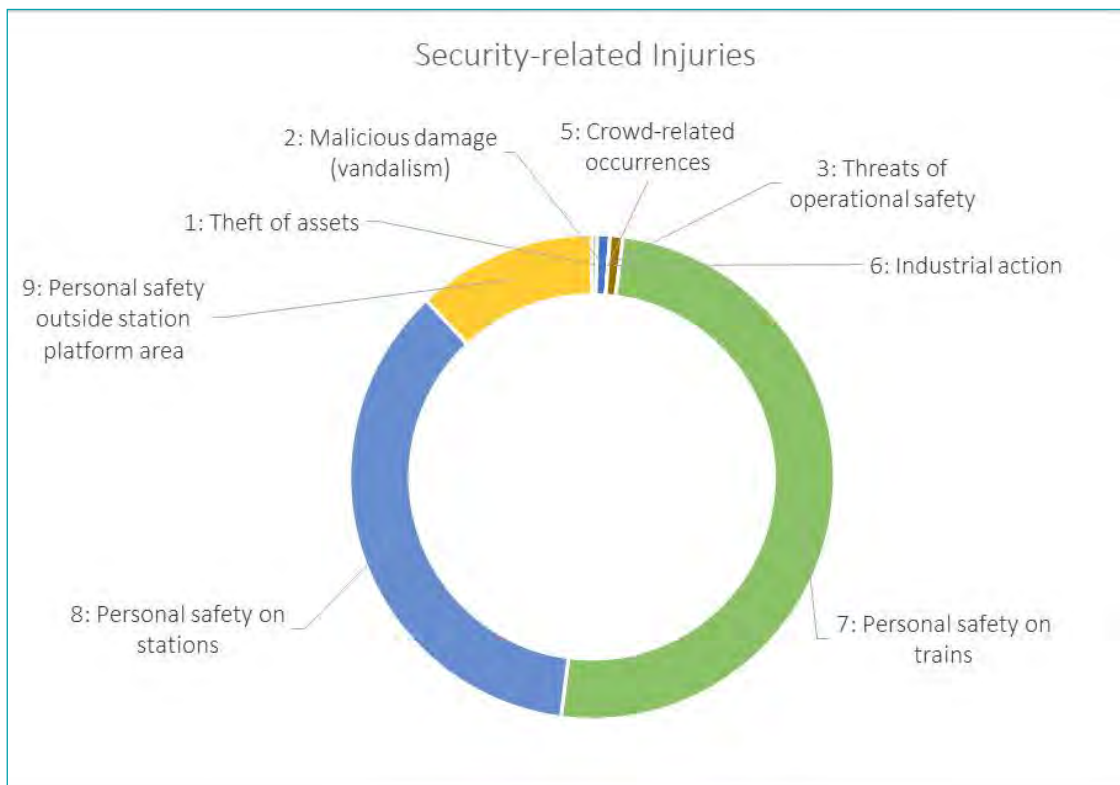


Figure 23: Number of security-related incidents per operator for 2018/19

Personal safety on trains and stations was the primary reason for security-related fatalities and security-related injuries (Figure 24 and 25).



**Figure 24: Security-related fatalities per SANS category (2018/19)**



**Figure 25: Security-related Injuries per SANS category (2018/19)**







# CHAPTER 3

# TRAIN COLLISIONS

This chapter focuses on the safety risks related to collisions during movement of rolling stock, SANS Occurrence Category A which covers the following:

- a) a collision between rolling stock on a running line;
- b) a collision of rolling stock with an obstruction on a running line (including road vehicles that collide with rolling stock);
- c) a collision of rolling stock with a stop block on a running line;
- d) a collision of rolling stock other than on a running line;
- e) a collision of rolling stock with an obstruction other than on a running line; and
- f) a collision of rolling stock with a stop block other than on a running line.

NOTE: Level crossing collisions or persons struck by rolling stock in motion are excluded from this category. Special attention is given to collisions between rolling stock on running lines [A-a] as this sub-category presents with the greatest overall risk.

## 2018/19 Noteworthy statistics

- A total of 873 collisions were reported during 2018/19; 15 per cent decrease compared to the previous reporting period.
- Per million train km, operators recorded a 38 per cent rise in SANS Category A collisions between rolling stock on running line occurrences since 2010/11
- TFR produced 20 per cent fewer train kilometres since 2010/11. On a normalised basis, TFR recorded an increase of 7 per cent collisions since 2010/11.
- PRASA produced 24 per cent fewer train kilometres since 2010/11. On a normalised basis, it recorded 20 per cent more collisions in 2018/19.
- More than 91 per cent of all collisions occur in Sub-category A-b, i.e. (collision of rolling stock with an obstruction on a running line (including road vehicles that collide with rolling stock)).
- The Gauteng province was responsible for 88 per cent of all train collision harm since 2010/11.
- 2018/19 alone resulted in 27 per cent of all harm over the nine years since 2010/11.

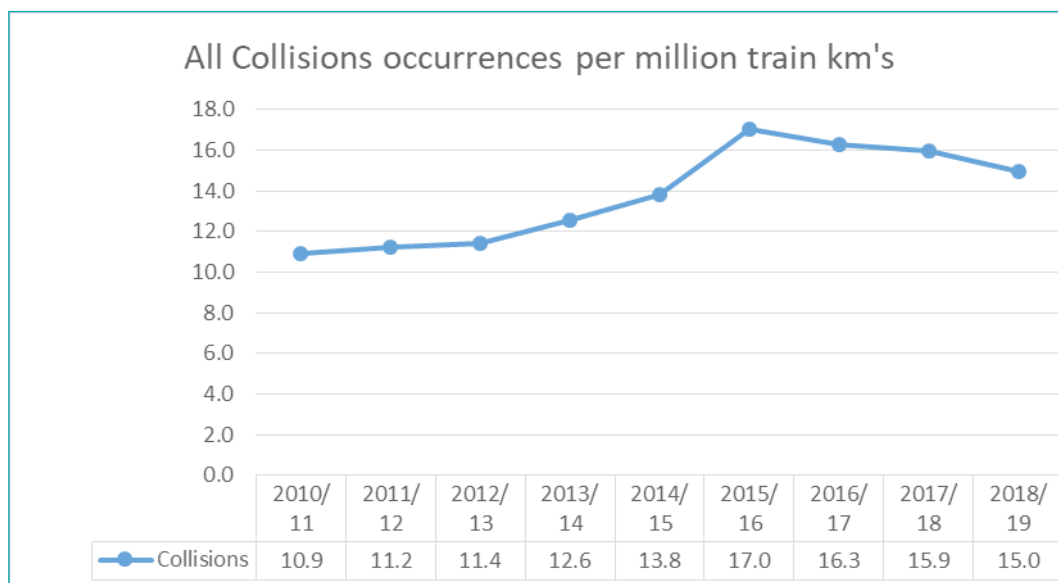
## Safety performance

Table 9 shows that in 2018/19 more than 90 per cent of all collisions during movement of rolling stock occurred in Subcategory A-b (collision of rolling stock with an obstruction on a running line (including road vehicles that collide with rolling stock)).

**Table 9: Collisions Subcategories 2010/11 to 2018/19**

Collisions Sub-categories	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	2018/19	2018/19
A-a	18	20	17	6	14	6	8	7	12	1,37%
A-b	705	666	714	850	933	1000	924	938	797	91,29%
A-c	4	10	14	4	3	2	4	2	1	0,11%
A-d	73	67	67	39	40	33	26	27	19	2,18%
A-e	33	66	69	55	53	43	32	33	36	4,12%
A-f	35	31	36	22	16	16	12	20	8	0,92%
<b>Total</b>	<b>868</b>	<b>860</b>	<b>917</b>	<b>976</b>	<b>1059</b>	<b>1100</b>	<b>1006</b>	<b>1027</b>	<b>873</b>	<b>100,00%</b>

On a normalised basis (per million train km) Figure 26 shows that operators recorded a 38 per cent rise in SANS Category A - Collisions between rolling stock on a running line occurrences since 2010/11.



**Figure 26: All SANS Category A collisions occurrences per million train km**

Table 10 shows TFR and PRASA's collisions data normalised per million train km for 2018/19.

**Table 10: Collisions normalised per million train km for TFR and PRASA**

COLLISIONS (NORMALISED PER MILLION TRAIN KM)									
	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
<b>TFR</b>	16.2	15.2	16.5	18.0	19.6	25.6	24.0	22.9	21.7
<b>PRASA</b>	1.79	2.01	1.79	2.24	2.34	1.98	2.10	2.20	2.79

Taken together, whereas TFR produced 20 per cent fewer train kilometres since 2010/11, yet it recorded 40 per cent more collisions in 2018/19; and whereas PRASA produced 24 per cent fewer train km since 2010/11, yet it recorded 56 per cent more collisions in 2018/19.



Figure 27 below shows the provincial breakdown of FWI's due to collisions since 2010/11 which is dominated by Gauteng.

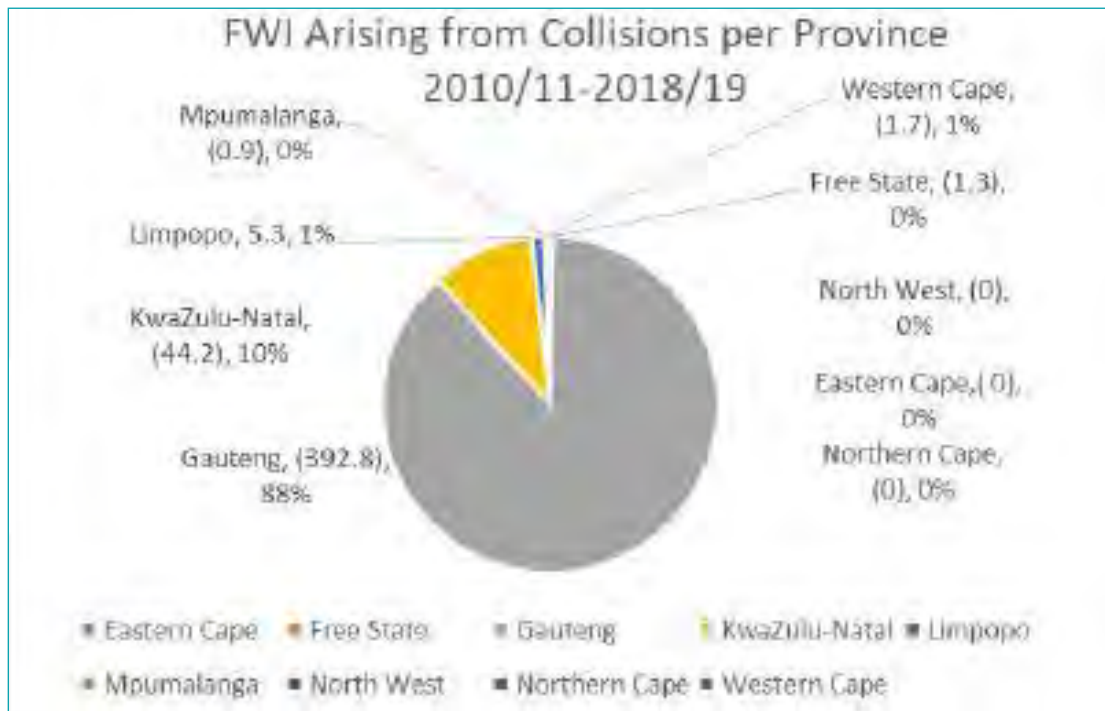


Figure 27: FWI arising from collisions per province 2010/11-2018/19

Figure 28 illustrates how each of the SANS A Subcategories contributes (actual number and in percentage) to the total number of collisions during the movement of rolling stock recorded for the period 2010/11-2018/19. Collisions with an obstacle on a running line (including road vehicles colliding with rolling stock) contributed to 87 per cent of all the train collisions that occurred during 2010/11 – 2018/19. Both collision of rolling stock other than on a running line [A-d] and collision of rolling stock with an obstruction other than on a running line [A-e] contributed to the overall number of the train collisions that occurred during the reporting period by 9 per cent. Collisions between rolling stock on a running line [A-a] were responsible for only 1 per cent of the total number of train collisions.

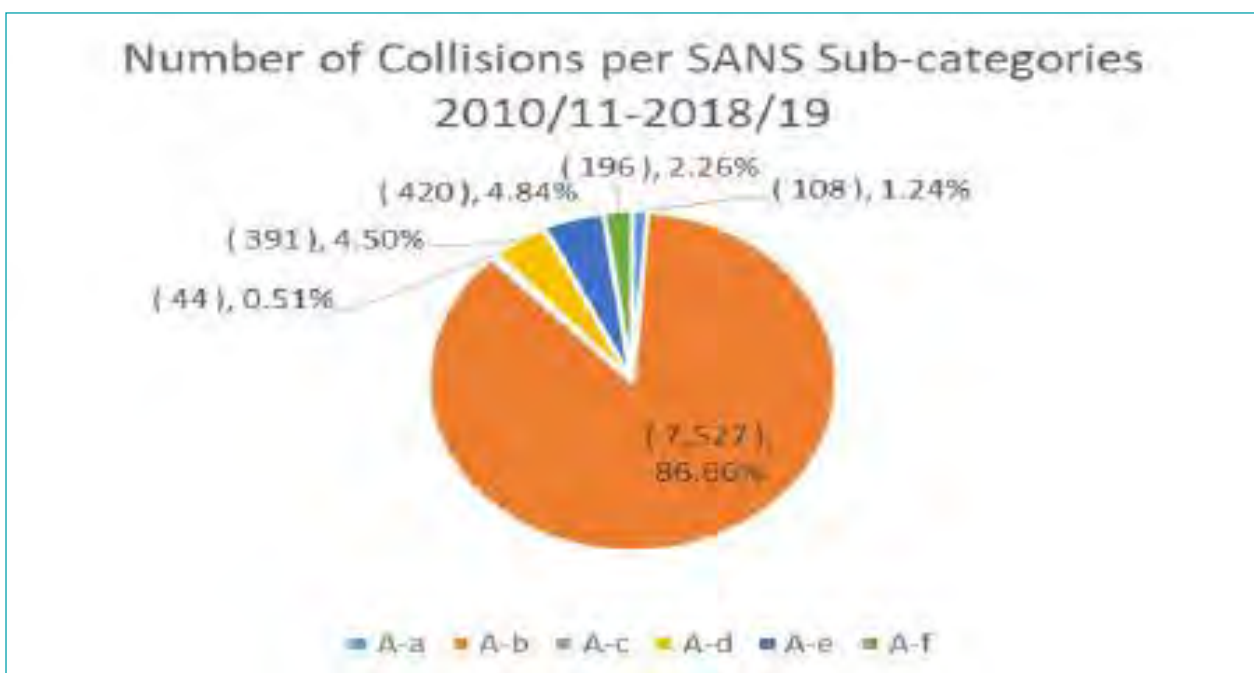


Figure 28: Percentage distribution of train collisions per SANS sub-categories

However, when investigating which train collisions sub-category was responsible for the most harm during the reporting period, a very interesting picture emerged. Figure 29 illustrates that Collisions between rolling stock on a running line [A-a] contributed most to the overall FWI for train collisions during the reporting period. Collisions with an obstacle on a running line (including road vehicles colliding with rolling stock) and collision of rolling stock other than on a running line contributed to a very small percentage of the overall FWI.

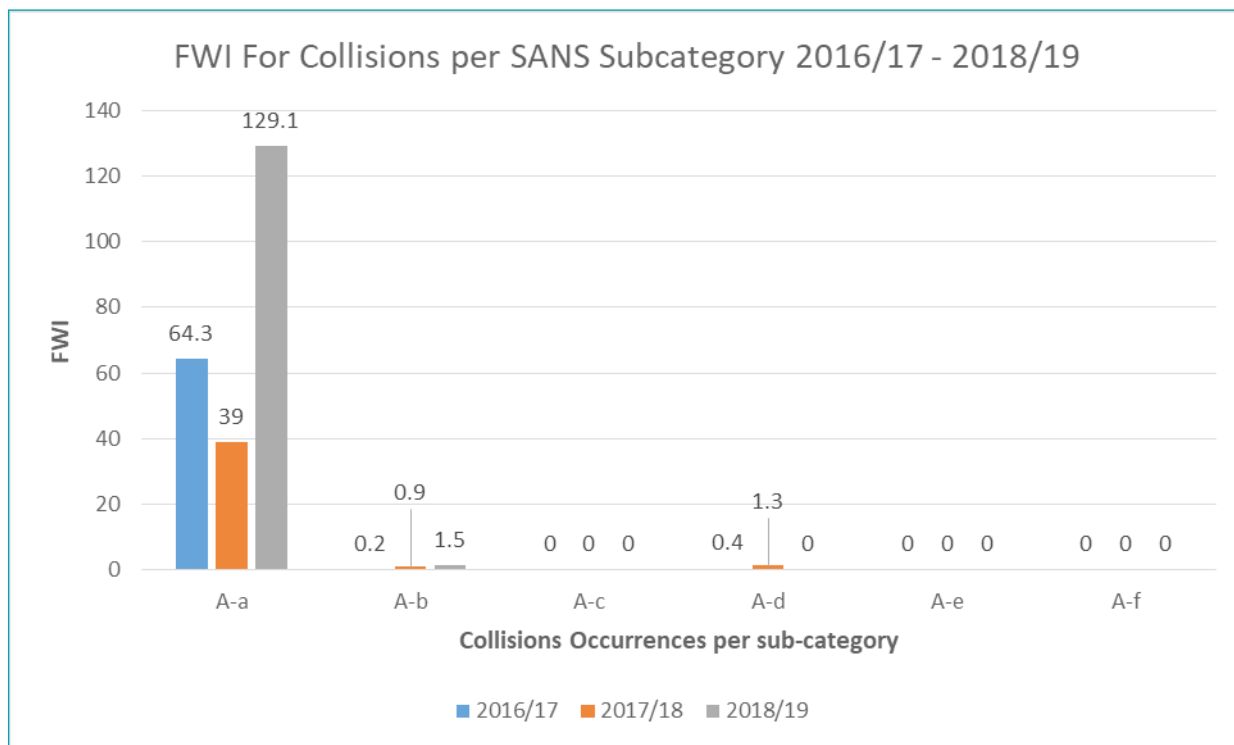


Figure 29: Percentage contribution of each train collisions SANS Sub-category to the overall FWI for train collisions for the 2010/11-2018/19 reporting period



Figure 30 shows that overall harm from collisions between rolling stock on running lines (A-a) was 7,6 times worse in 2018/19 (129,1 FWIs) compared to 2010/11 (16,9 FWIs).

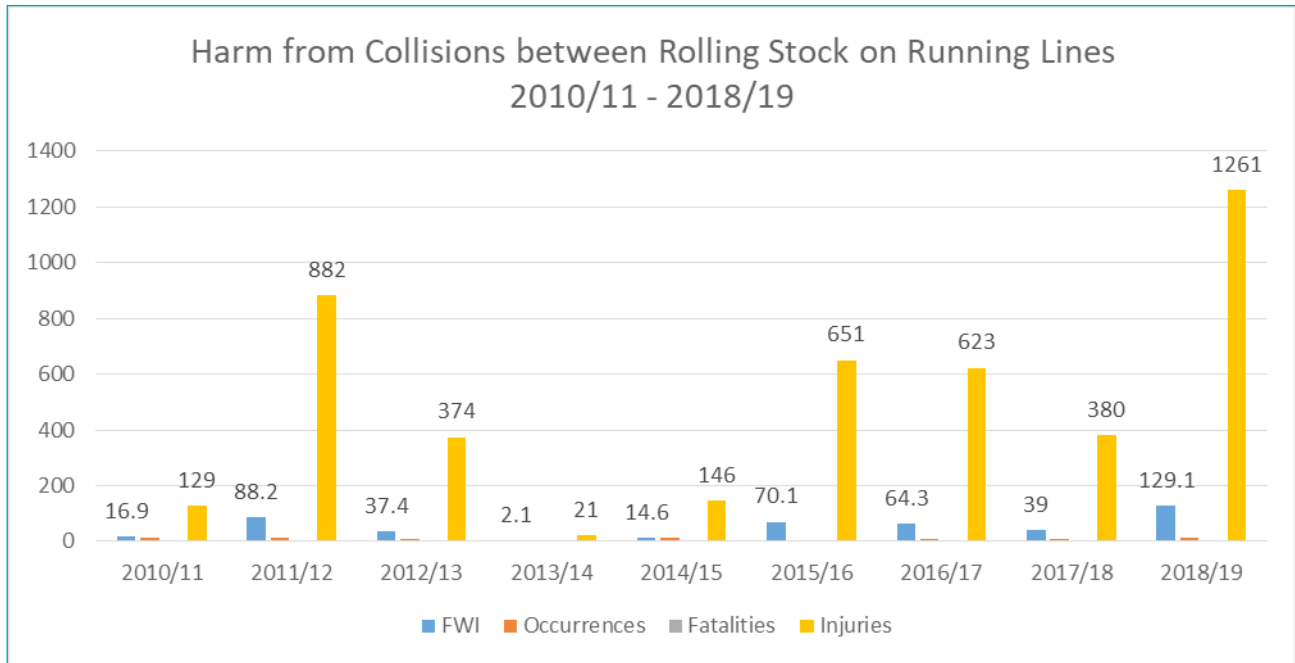


Figure 30: Harm from collisions between rolling stock on running lines 2010/11 - 2018/19

Figure 31 shows the number of train collisions and their respective consequences (fatalities and injuries) for the 2010/11 to 2018/19 Financial Years. This figure indicates a decreasing trend in train collisions from 2010/11-2012/13, an increasing trend from 2013/14 – 2015/16 and then a stabilisation after 2015/16. Injuries arising from these occurrences fluctuate year-on-year and are independent on the number of train collisions. Of note, fatalities arising from train collisions appear to be negligible except for the 2015/16 Financial Year (FWIs = 88,1). This anomaly is due to a single event that dominated the dataset for 2015/16 – a Metrorail collision with a taxi on a running line that resulted in 15 fatalities. The same could be observed in the 2011/12 Financial Year (FWI = 89,3). As in the previous case, a single collision (on 20 May 2011 between Mzimhlope and Phomolong) with 857 injured passengers was responsible for the high FWI value.



Figure 31: Number of train collisions and related fatalities and injuries 2010/11 – 2018/19

Since 2010/11, the harm per collision has increased 6-fold (Figure 32). If the more conservative linear trend is accepted, the harm per collision will 5 - fold in 2019/20 compared to 2010/11.

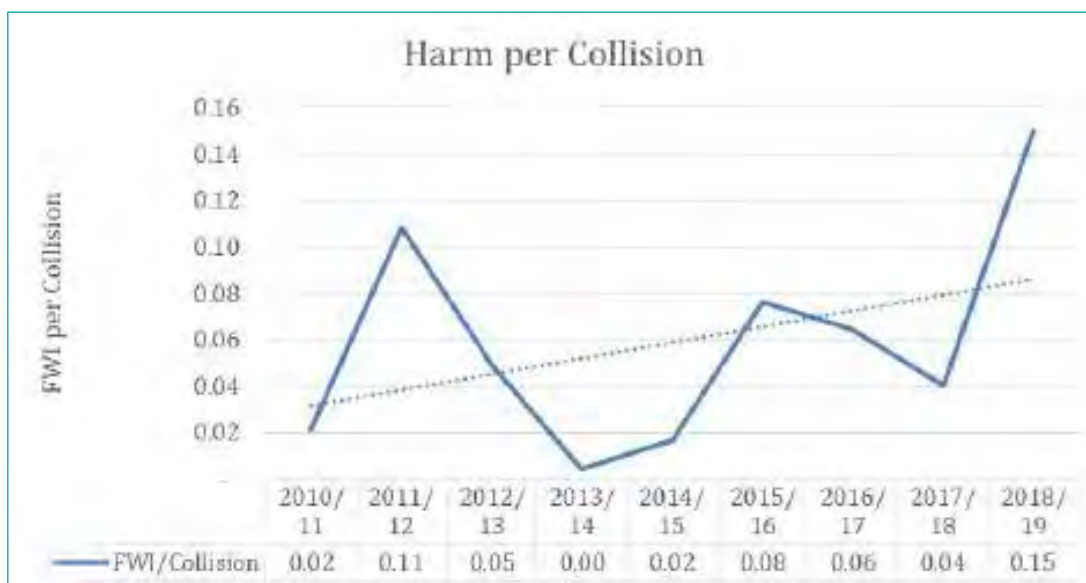


Figure 32: Harm caused per collision (FWI/collision) 2010/11-2018/19

As can be seen in Figure 33, there was an exceptionally high number of injuries in the 2011/12 – 2012/13 and 2015/16 – 2018/19 Financial Years resulting from train-on-train collisions. Whereas the 2011/12 Financial Year recorded an FWI value of 88.2 and number of injuries (882). The 2018/19 Financial Year recorded a 43 per cent higher number of injuries (1261).

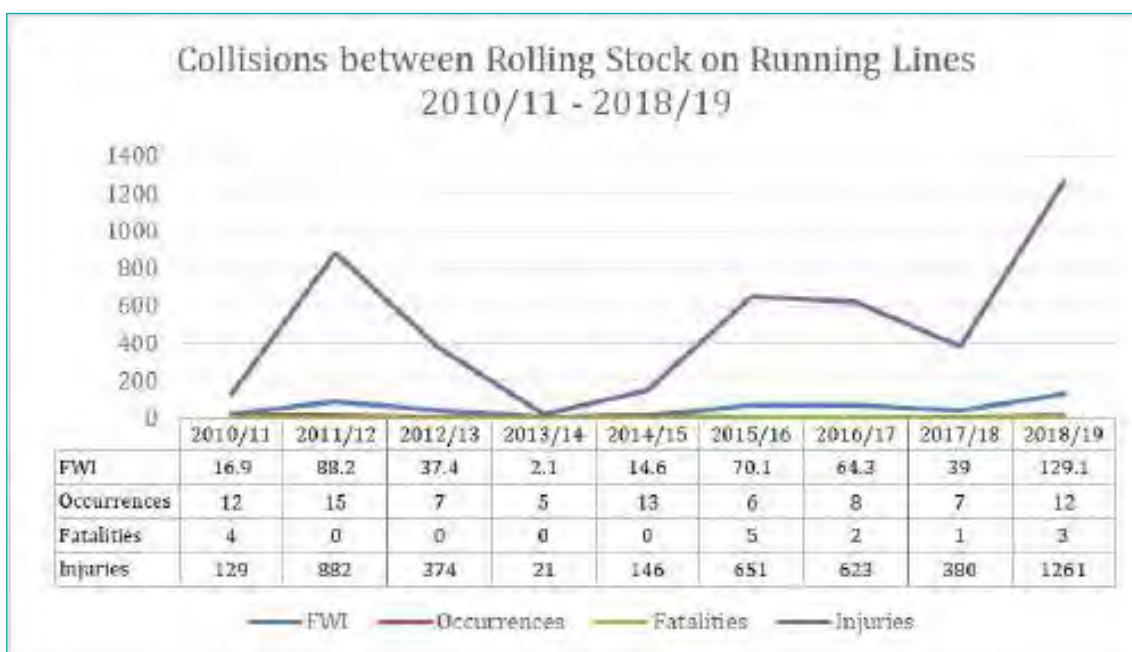


Figure 33 Fatalities and injuries vs the number of train-on-train collisions on running lines





# CHAPTER 4

# DERAILMENTS

This chapter covers the safety risks related to derailments during movement of rolling stock, SANS Occurrence Category B which covers the following:

- a) derailments of rolling stock on a running line;
- b) derailments of rolling stock on a line other than a running line; and
- c) derailments of rolling stock during tipler activities.

## 2018/19 Noteworthy statistics

- A total of 370 derailments were reported during 2018/19; 18 per cent decrease compared to the previous reporting period.
- Overall, there was a 32 per cent decrease in derailments per million train km since 2010/11.
- Whereas the 2018/19 Financial Year witnessed an 18 per cent decrease in total train derailments when compared with the previous financial year. On a per million train km normalised basis, this represents an 8 per cent increase.
- Since 2010/11, the FWI value has decreased by 85 per cent.

## Safety performance

Despite a 8 per cent increase since 2017/18, Figure 34 shows a 32 per cent decrease in all derailments per million train km since 2010/11. This must be read with the knowledge that the two largest operators, namely TFR (20 per cent fewer) and PRASA (24 per cent fewer) produced fewer train km since 2010/11.

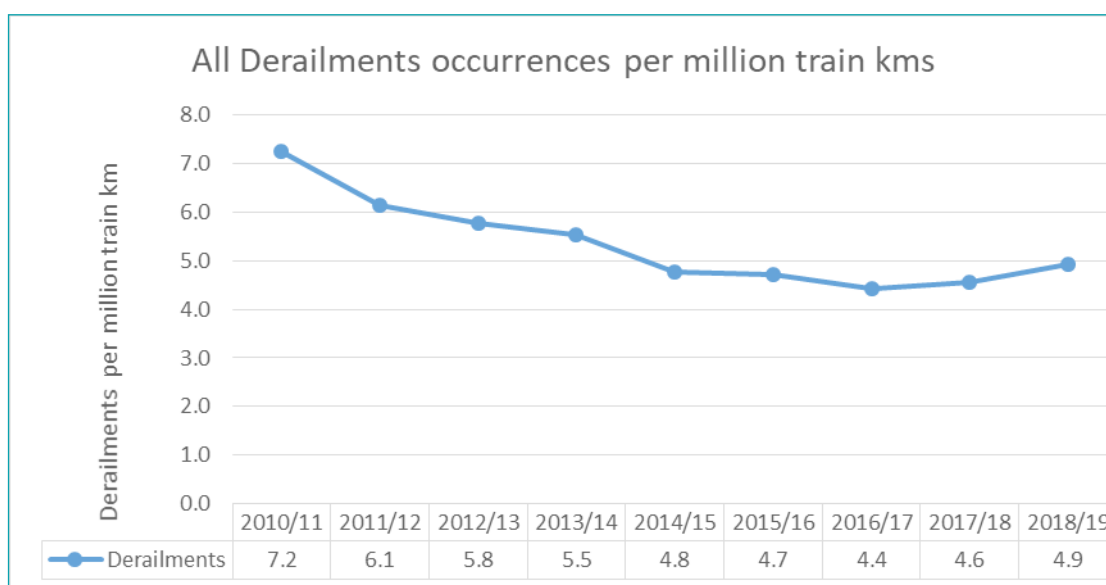


Figure 34: Number of train derailments

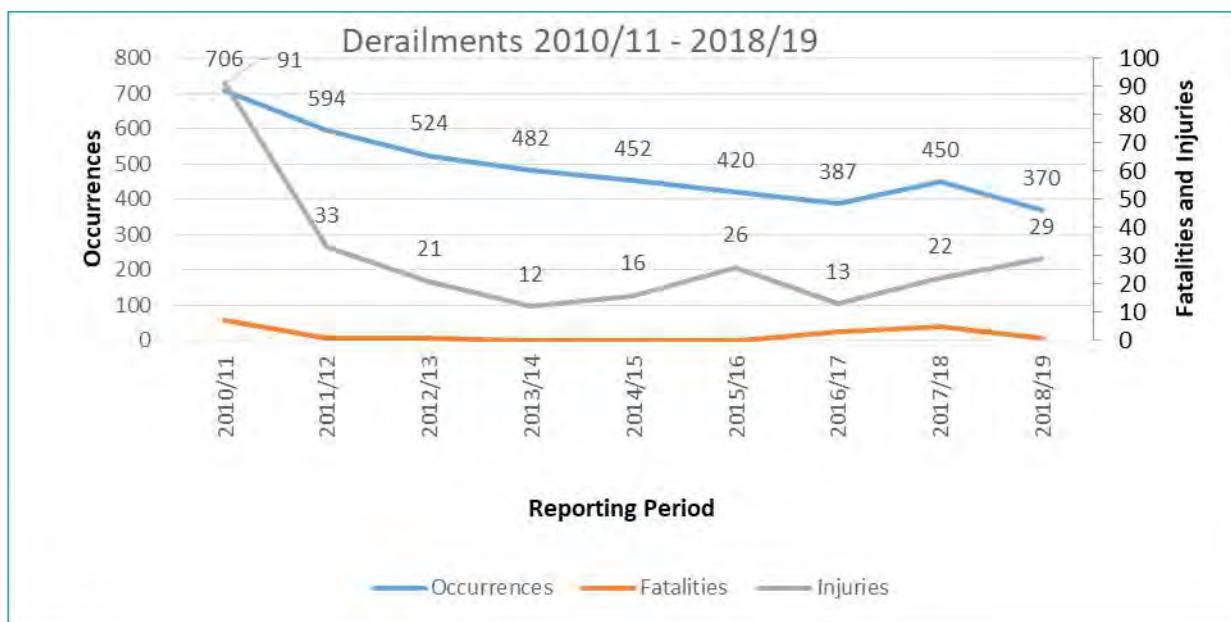
Table 11 shows total derailments normalised per million train km for the largest two operators, TFR and PRASA. The 2018/19 Financial Year witnessed a 16 per cent decrease in total train derailments when compared with the previous financial year. However, on a per million train km normalised basis, this only represents an 8 per cent decrease. Since 2010/11 (16,1), the FWI value has decreased by more than 76 per cent to 3,8 for 2018/19. On a per million train km normalised basis, this represents a 70 per cent decrease since 2010/11.

**Table 11: Total derailments normalised per million train km for TFR and PRASA**

DERAILMENTS (NORMALISED PER MILLION TRAIN KM)									
	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
TFR	10.8	8.3	8.3	7.7	6.5	6.4	6.1	5.8	6.3
PRASA	1.06	1.16	0.94	1.48	1.38	1.67	1.31	2.10	2.39

Figure 35 depicts the number of train derailments and their respective consequences (fatalities and injuries) for the 2010/11 to 2018/19 reporting periods. This figure indicates a decreasing trend for the number of occurrences during 2010/11 - 2016/17 with an increase in 2017/18 and, recovering to a downward trend in 2018/19.

The consequences of the occurrences expressed as FWIs shows a similar pattern with the exception of 2015/16. The FWI value for the 2015/16 Financial Year increased due to a spike in the number of injuries (62.5 per cent increase compared with 2014/15).



**Figure 35: Number of train derailments and related fatalities and injuries**

Figure 36 shows that derailment of rolling stock on a running line accounted for an average of 30 per cent of the fatalities and injuries caused by derailments. In the last year, this rose to 37 per cent.

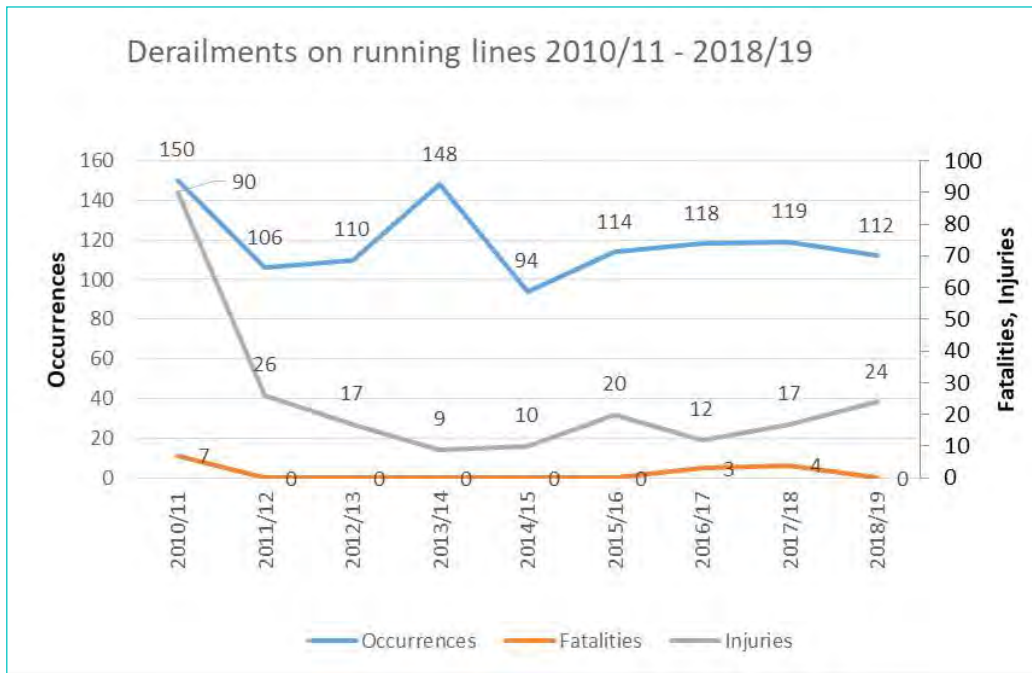


Figure 36: Number of train derailments and related fatalities and injuries

Figure 37 shows the relative distribution of the consequences of derailments expressed as FWI for the provinces. The Gauteng (24,7 per cent) and KwaZulu-Natal (18 per cent) provinces account for the majority of the consequences.

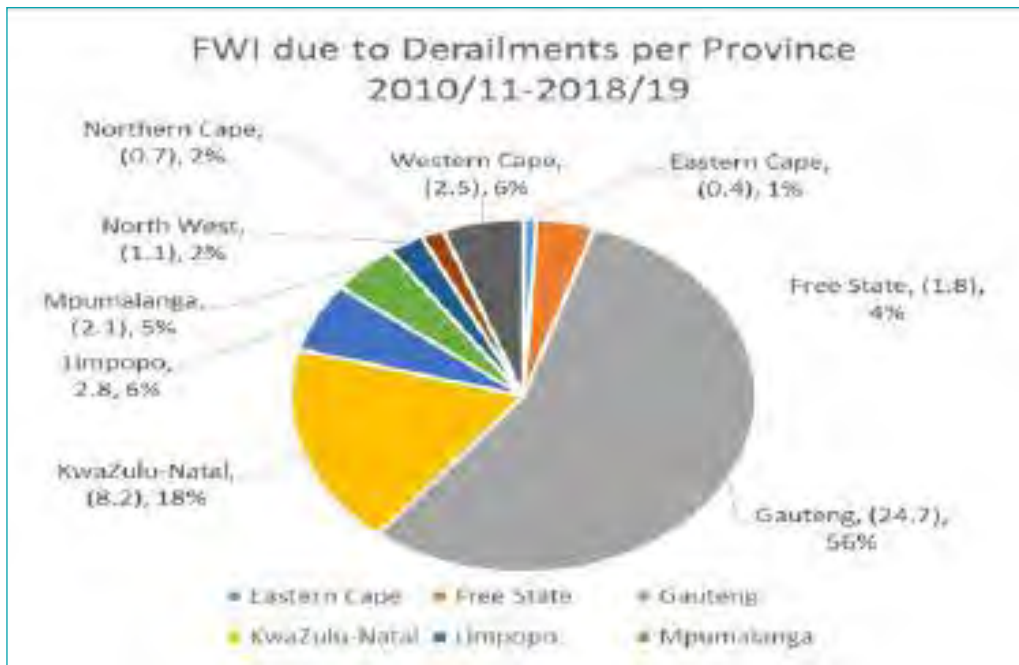


Figure 37: Geographical distribution of consequences due to derailments expressed as FWI



# CHAPTER 5

# LEVEL CROSSINGS

This chapter covers the safety risks related to train accidents at level crossings and examines the relationships between occurrence sub-categories and their respective consequences. To understand the risks borne by different road-rail user groups, distinctions were made between train passengers, pedestrians and road vehicle users (i.e. the public) and the workforce (train drivers and assistants) for the 2018/19 Financial Year.

- a) collisions between rolling stock and road vehicles (including motor vehicles, bicycles and animal-drawn vehicles) at a recognised level crossing on a running line;
- b) collisions between rolling stock and road vehicles (including motor vehicles, bicycles and animal-drawn vehicles) on any line other than a running line (including yards, sidings and private sidings) at a recognised level crossing;
- c) people struck by rolling stock at a recognised pedestrian level crossing; and
- d) people struck by rolling stock at a recognised road level crossing.

## 2018/19 Noteworthy statistics

- A total of 133 level crossing occurrences were reported during 2018/19; a 6 per cent increase compared to the previous reporting period.
- The North West, KwaZulu-Natal and Western Cape provinces accounted for 56 per cent of all level crossing occurrences in 2018/19.
- Level crossing occurrences decreased by 12,5 per cent overall since 2010/11.
- The number of level crossing occurrences for 2018/19 increased by 52 per cent over the 2015/16 (87 in total) low point.
- Level crossing occurrences per million train km increased by 69 per cent between 2014/15 and 2018/19. This upward trend is amplified as the largest operators, TFR and PRASA produced fewer train km over the same period.
- Of the 25 fatalities at level crossings during the 2018/19 Financial Year, 22 (88 per cent) were road vehicle users and three (12 per cent) were pedestrians. There were no train passenger fatalities due to level crossing occurrences in 2018/19.
- Of the 75 injuries at level crossings during 2018/19, 70 (93 per cent) were road vehicle users, two (3 per cent) were train drivers/assistants, three (4 per cent) were pedestrians and no injuries to train passengers were recorded.
- The overall level of harm at level crossings in 2018/19 was 32,5 FWI harm, compared with 67,6 FWI harm for 2017/18 (the latter was distorted by the Geneva level crossing occurrence).
- Most level crossing risk in 2018/19 arose from road vehicle user behaviour.

## Safety performance

Table 12 shows a 12,5 per cent reduction in level crossing occurrences since 2010/11. The 2018/19 level is, however, 31 per cent higher than the lowest level of 102 level crossing occurrences in 2014/15.

**Table 12: Level crossing occurrences by province since 2010/11**

PROVINCE	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	2018/19
North West	32	16	22	23	11	17	19	29	27
KwaZulu-Natal	27	27	24	8	17	11	25	18	24
Western Cape	18	18	20	18	12	15	21	30	24
Gauteng	20	13	11	13	21	14	23	23	13
Mpumalanga	23	11	7	12	10	10	20	9	14
Free State	3	9	13	8	11	6	4	8	9
Eastern Cape	16	13	2	5	7	5	6	0	11
Limpopo	11	5	5	11	8	5	5	6	7
Northern Cape	2	4	3	6	4	4	3	3	4
<b>Total</b>	<b>152</b>	<b>117</b>	<b>108</b>	<b>104</b>	<b>102</b>	<b>87</b>	<b>126</b>	<b>126</b>	<b>133</b>

Table 12 indicates that for the 2011/12 – 2018/19 Financial Years, each of the provinces revealed different trends for level crossing occurrences. As illustrated in Figure 42, a decreasing trend for the 2011/12 – 2015/16 Financial Years can be observed. This was followed by an increasing trend for 2016/17 to 2017/18 (peak) to 2018/19.

This increase can be primarily attributed to level crossing occurrences that took place in the Western Cape and Gauteng provinces. Since 2010/11, both provinces recorded the highest occurrence values in the 2016/17 and 2017/18 Financial Years. The North West, KwaZulu-Natal and Mpumalanga provinces contributed to the increasing trend to a minor degree.

When examining the distribution of occurrences by province for the 2010/11-2018/19 period, the North West, KwaZulu-Natal, Western

Cape and Gauteng provinces contributed to approximately two-thirds of the total level crossing occurrence load.

The North West, KwaZulu-Natal and Western Cape provinces account for 75 per cent of all level crossing occurrences (Figure 38).

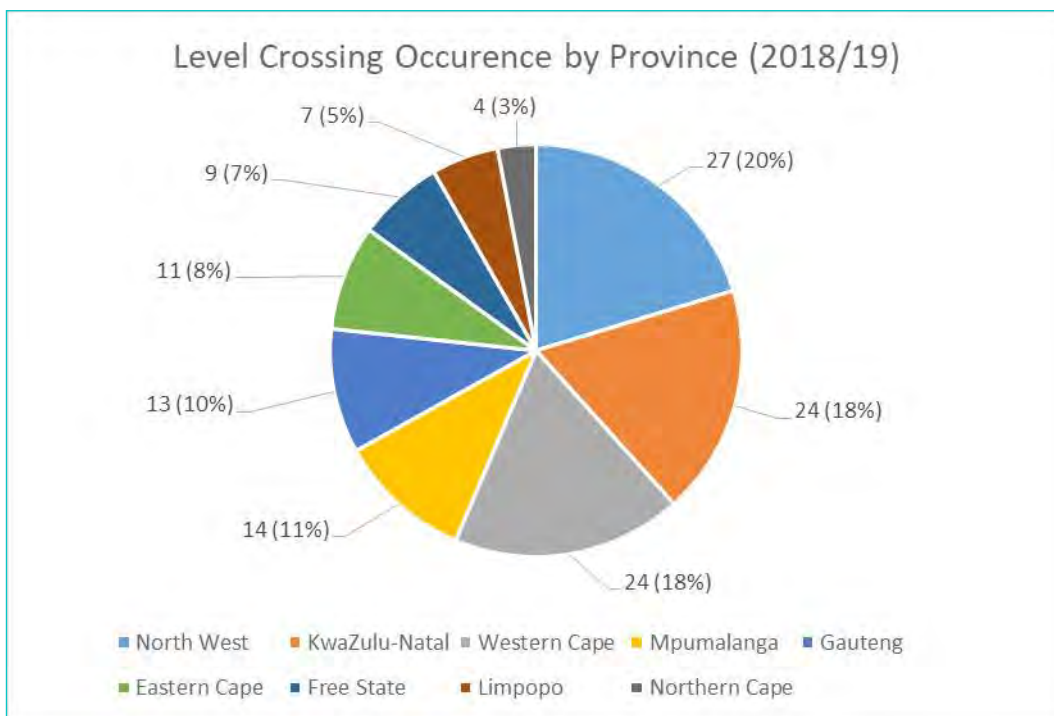


Figure 38: Level crossing occurrence by province (2018/19)

Figure 39 shows the number of level crossing occurrences and their respective consequences (fatalities and injuries) between 2010/11 and 2018/19.

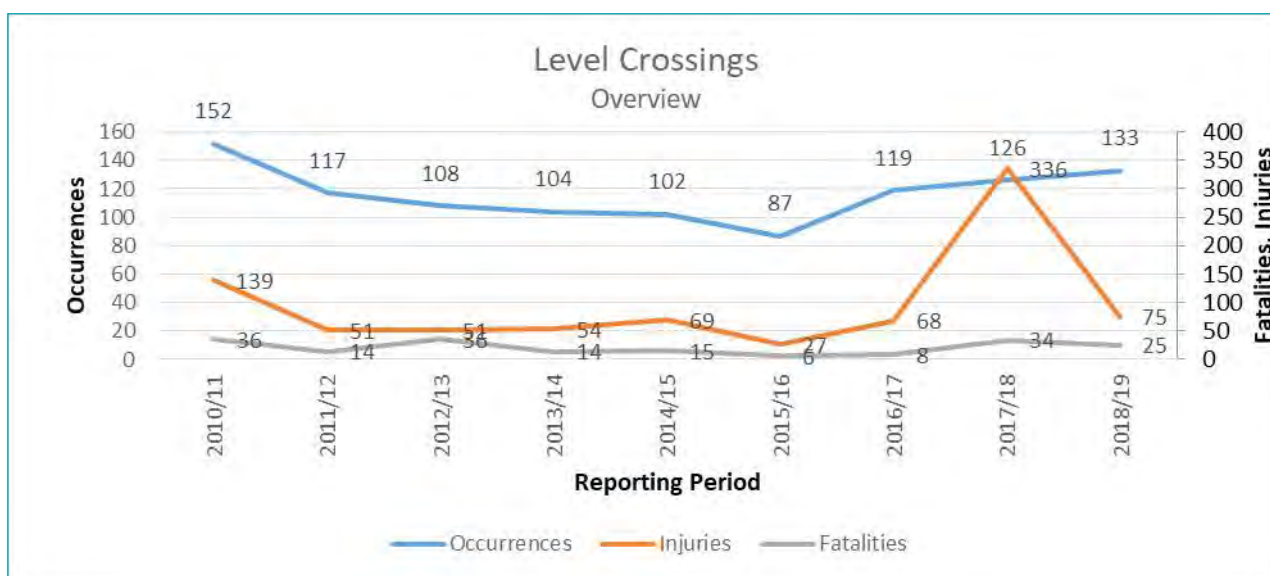
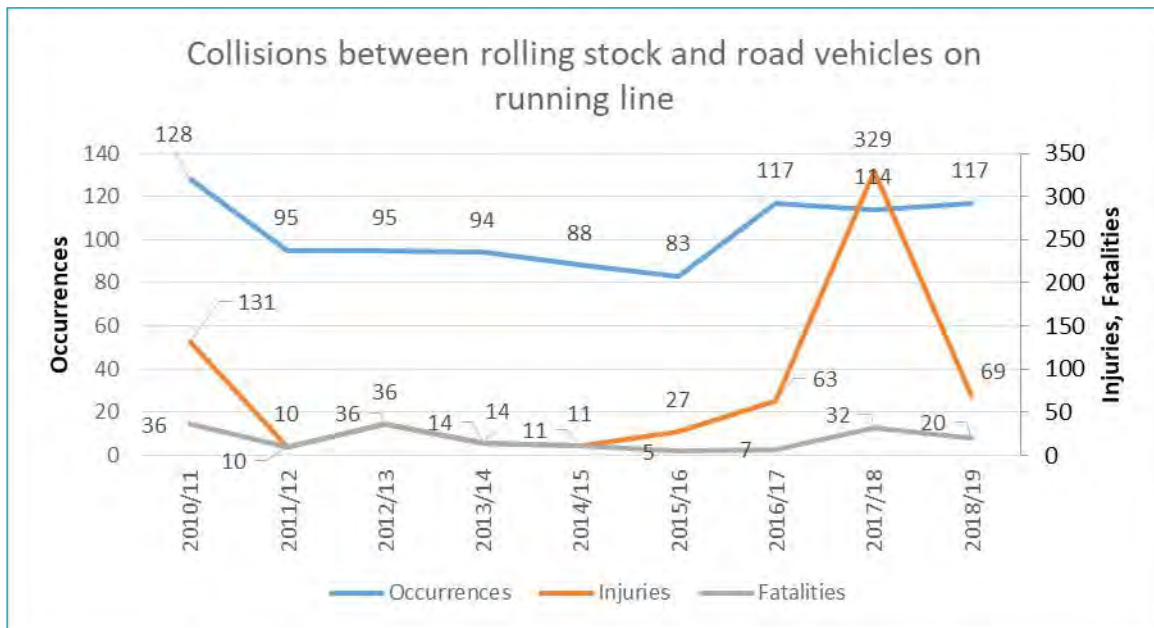


Figure 39: Number of level crossing occurrences and their respective consequences (fatalities and injuries) between 2010/11 and 2018/19

The variation in the overall trend for level crossing occurrences derives from the level crossing occurrence subcategory collisions between rolling stock and road vehicle/s on a running line (Figure 40).





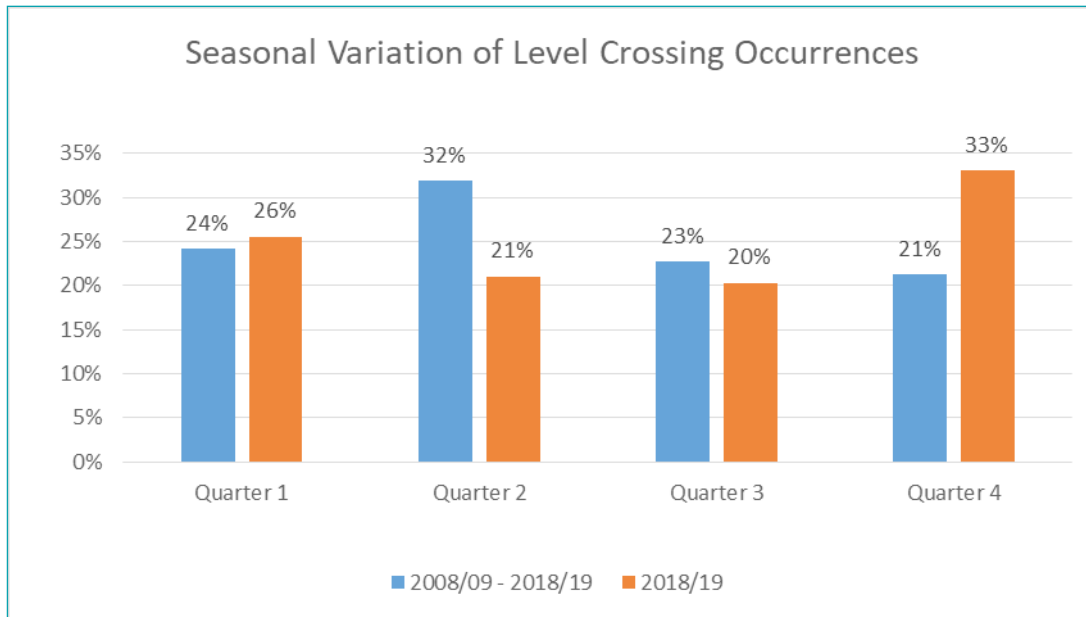
**Figure 40: Collisions between rolling stock and road vehicles on running line**

A detailed analysis of the reported occurrences illustrated that single occurrence events with extraordinarily high consequences dominated the time series of consequences. Two accidents on 31 July 2010 and 25 August 2010 respectively caused three fatalities and 33 injuries and eight fatalities and eight injuries respectively. A single accident on 13 July 2012 between Impala and Hectorspruit in Mpumalanga caused 26 fatalities. On 04 January 2018, the level crossing accident at Geneva in the Free State resulted in 24 fatalities and 263 injuries.

In cases where such high consequences were observed, the data indicated that a minibus or a school bus was involved or that the train collided with a lorry that resulted in a derailment and fire (as seen in the Geneva level crossing occurrence). The nature of these accidents reveals that a decrease in level crossing occurrences will not necessarily result in a decrease in fatalities and injuries.

A more detailed analysis of the various level crossing occurrence categories that examined the relationships between occurrences and consequences indicated that most level crossing occurrences with substantial consequences occur on a running line and comprise of collisions between rolling stock and road vehicles (Figure 40). In 2018/19, this subcategory contributed to 88 per cent of the level crossing occurrences resulting in 80 per cent of deaths, 92 per cent of injuries and 83 per cent of level crossing FWIs.

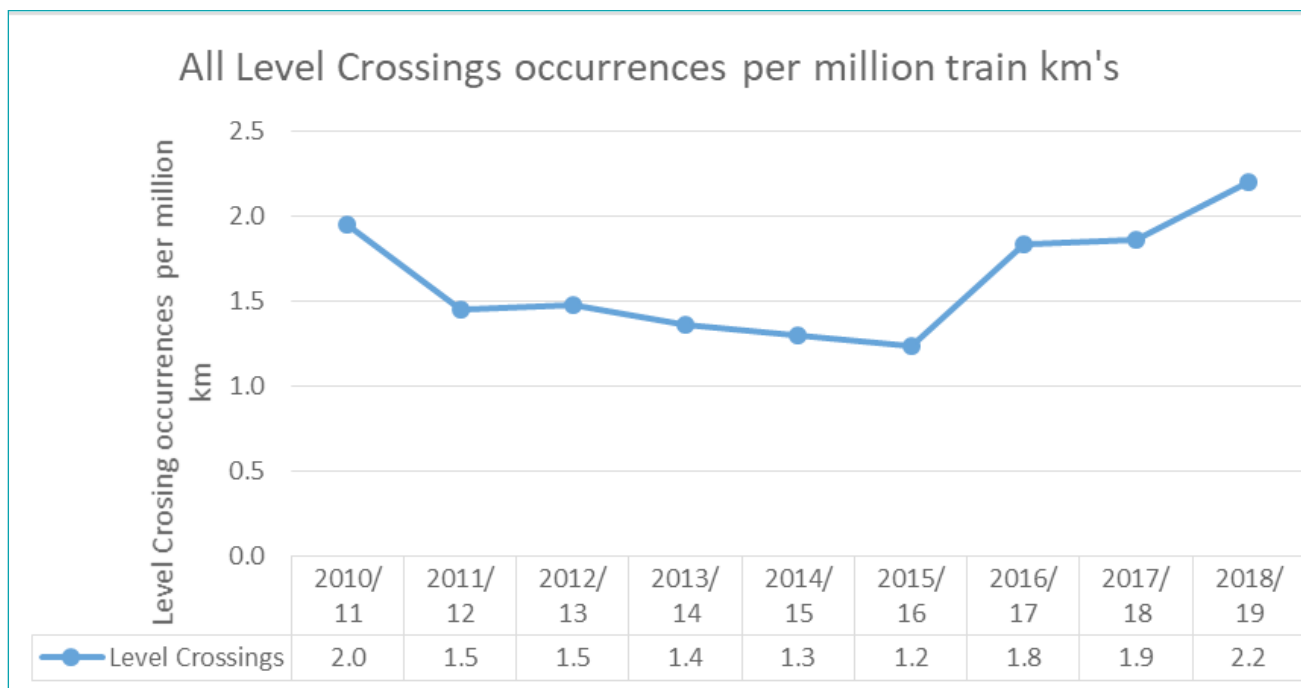
An analysis of the seasonal distribution of the level crossing occurrence data since 2008/09 shows that despite the majority of occurrences taking place in the second quarter of the financial year (July to September). In 2018/19, level crossing occurrences peaked in the summer season or fourth quarter. The reason for this phenomenon is not yet known and will require a much more detailed investigation for meaningful interventions to be implemented.



**Figure 41: Quarterly distribution of level crossing occurrences since 2008/09**

Figure 42 shows an upward trend for level crossings occurrences per million train km.

Since 2017/19 level crossings occurrences per million train km increased by 16 per cent, but between 2014/15 and 2018/19 this increased by 69 per cent. This upward trend is amplified as the largest operators produced fewer train km over the same period, with TFR down by 6 per cent and PRASA down by 9 per cent.



**Figure 42: All level crossing occurrences per million train km**



# CHAPTER 6

# PEOPLE STRUCK BY TRAINS

This chapter covers the safety risks related to derailments during movement of rolling stock, SANS occurrence Category E, which covers cover the following:

- a) occurrences where a member of the public is struck by rolling stock on a running line;
- b) occurrences where an employee is struck by rolling stock on a running line;
- c) occurrences where a contractor or a contractor's employee is struck by rolling stock on a running line;
- d) occurrences where a member of the public is struck by rolling stock on a line other than a running line;
- e) occurrences where an employee is struck by rolling stock on a line other than a running line; and
- f) occurrences where a contractor or a contractor's employee is struck by rolling stock on a line other than a running line.

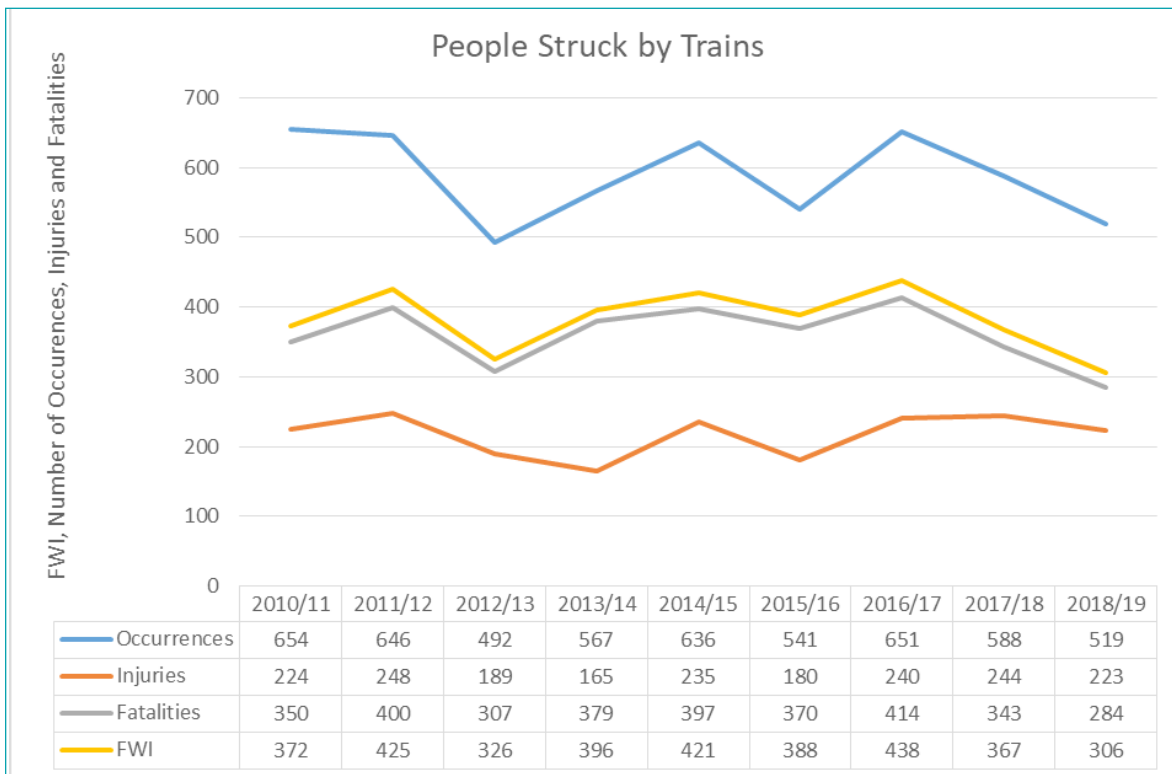
**NOTE:** In this category, only the number of occurrences should be recorded and not the number of persons injured or fatally injured (or both).

## 2018/19 Noteworthy statistics

- A total of 519 people struck by train occurrences were reported during 2018/19; a 12 per cent decrease compared to the previous reporting period.
- While the number of people struck by trains occurrences reduced by 21 per cent and the calculated FWI count decreased by 18 per cent between 2010/11 and 2018/19, the FWI per million train km reduced only by 2 per cent.
- People struck by trains occurrences are lethal with one fatality occurring daily on average since 2010/11. The FWI level on average is only 6 per cent higher than the actual fatalities.
- Gauteng, Western Cape and the KwaZulu-Natal provinces recorded 88 per cent of the people struck by trains during movement of rolling stock occurrence category, in line with the long-term trend.
- The long-term average of harm is 5,5 FWIs per million train km.

## Safety performance

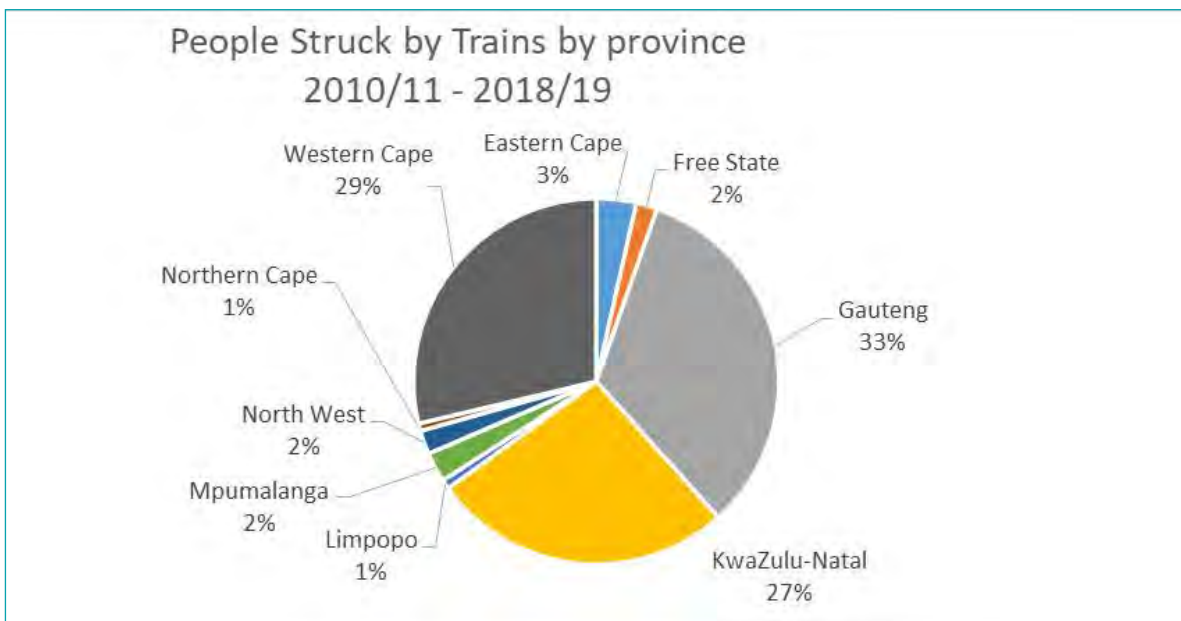
Figure 43 illustrates the number of people struck by trains occurrences and their respective consequences (fatalities and injuries) and the calculated FWI for the 2010/11 to 2018/19 Financial Years. While the number of people struck by trains occurrences reduced by 21 per cent and the calculated FWI count decreased by 187 per cent between 2010/11 and 2018/19, the FWI per million train km reduced by only 3 per cent.



**Figure 43: Number of people struck by trains occurrences and related harm to persons**

People struck by trains occurrences are lethal with one fatality occurring daily on average since 2010/11. This is evidenced by the FWI level which on average is only 6 per cent higher than the actual fatalities.

Since 2010/11 the Gauteng, Western Cape and KwaZulu-Natal provinces recorded 89 per cent of the people struck by trains during movement of rolling stock occurrence category (Figure 44).



**Figure 44: Distribution of people struck by trains occurrences by province for 2010/11-2018/19**

Figure 45 shows a continued dominance of people struck by trains during movement of rolling stock occurrences by the three largest metropolitan cities during the 2018/19 Financial Year.

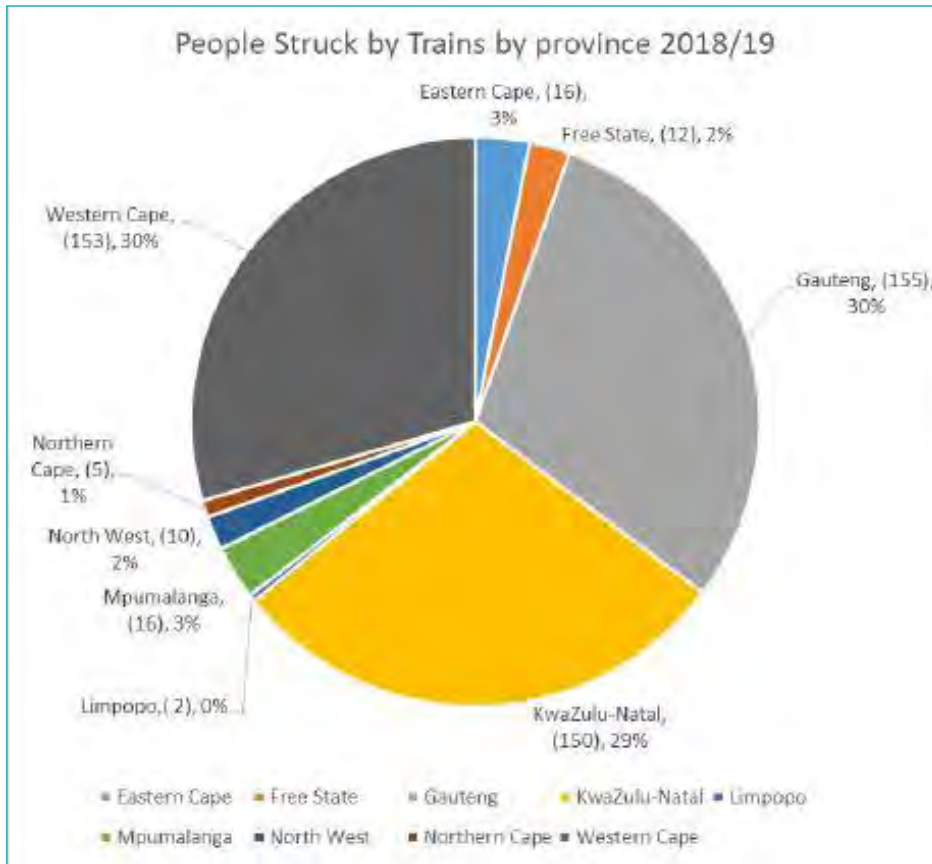


Figure 45: Percentage distribution of people struck by trains occurrences by province for 2018/19

The time-of-day analysis in Figure 46 indicates that the public is most at risk during the morning and afternoon peak hours 06h00-08h00 and 16h00-18h00 when the daily Metrorail train density is at its highest. This is indicative of people going to work or school. The results suggest that this may be related to trespassing on the running line.

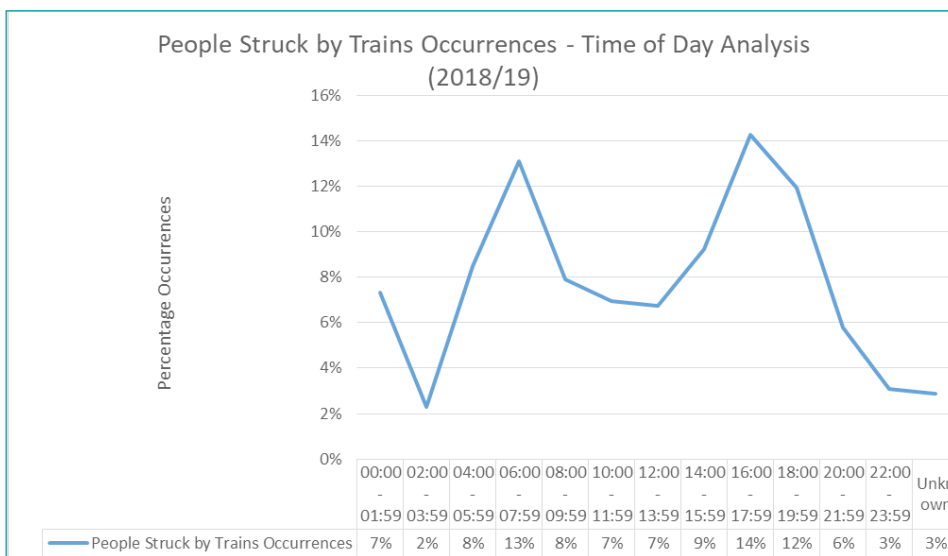
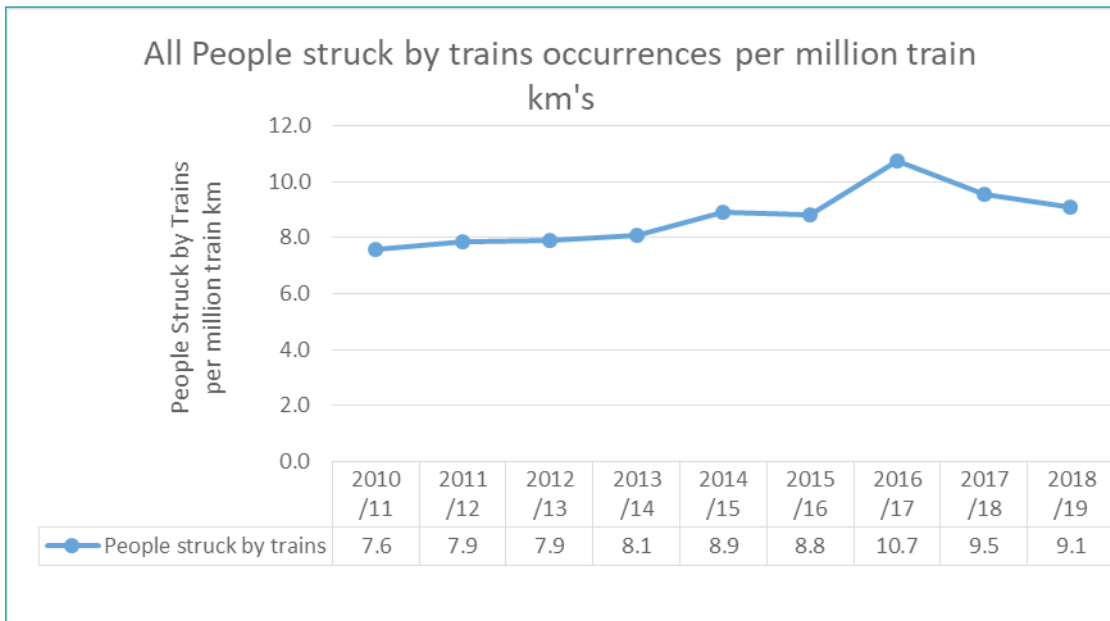


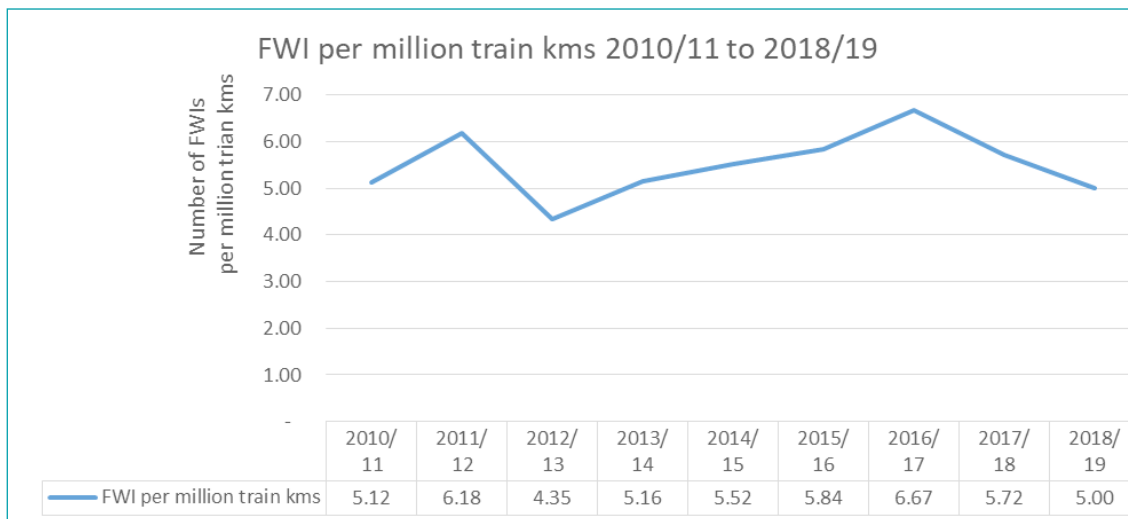
Figure 46: 2018/19 time-of-day analysis - people struck by trains occurrences

Figure 47 shows that while all people struck by trains occurrences per million train km reduced by 3 per cent since 2017/18, it increased by 20 per cent since 2010/11.



**Figure 47: All people struck by trains occurrences per million train km**

Figure 48 shows a long term average of 5,5 FWIs per million train km.



**Figure 48: FWI per million train km from 2010/11 to 2018/19**







# CHAPTER 7

# PLATFORM-TRAIN INTERCHANGE

This chapter covers the safety risks related to occurrences that occur at the station / or on the platform as passengers and the workforce entrain and detrain stationary or moving trains.

- a) occurrences where a passenger fell between the train and the platform while entraining/detraining a stationary or moving train;
- b) occurrences where a passenger fell on the platform while entraining/detraining a stationary or moving train;
- c) occurrences where an employee fell between the train and the platform while entraining/detraining a stationary or moving train;
- d) occurrences where an employee fell on the platform while entraining/detraining a stationary or moving train;
- e) occurrences where a contractor or a contractor's employee fell between the train and the platform;
- f) occurrences where a contractor or a contractor's employee fell on the platform while entraining/detraining a stationary or moving train.

## 2018/19 Noteworthy statistics

- While 2018/19 PTI occurrences reduced by 16 per cent (625 in total) compared to 2017/18 (744 in total), PTI occurrences contributed to 16 per cent of the overall recorded operational occurrences in 2018/19.
- PTI occurrences on average result in nine fatalities annually and 97 per cent of PTIs result in injuries.
- PTI occurrences are a weekday, peak hour phenomenon indicating possible overcrowding of stations as a major concern.
- The Gauteng province represents more than half of all PTI occurrences, followed by KwaZulu-Natal and the Western Cape. The three large metropolitan areas represent 99 per cent of the 2018/19 PTI occurrences.
- PTI occurrences increased drastically by 54 per cent since 2010/11 on a normalised basis.
- PTI occurrences have increased by 30 per cent since 2010/11 based on total numbers.

## Safety performance

The Platform-train interchange (PTI) occurrences account for a significant number of occurrences recorded at train stations within South Africa. The total number of PTI occurrences recorded for 2018/19 was 625 and represents a decrease of 16 per cent when compared to that recorded for the 2017/18 Financial Year. During the 2018/19 reporting period, this category contributed to 16 per cent of the overall recorded operational occurrences. Most of these occurrences are attributed to PRASA.

Figure 49 shows that while PTI occurrences on average result in nine fatalities annually, 97 per cent of PTIs result in injuries.

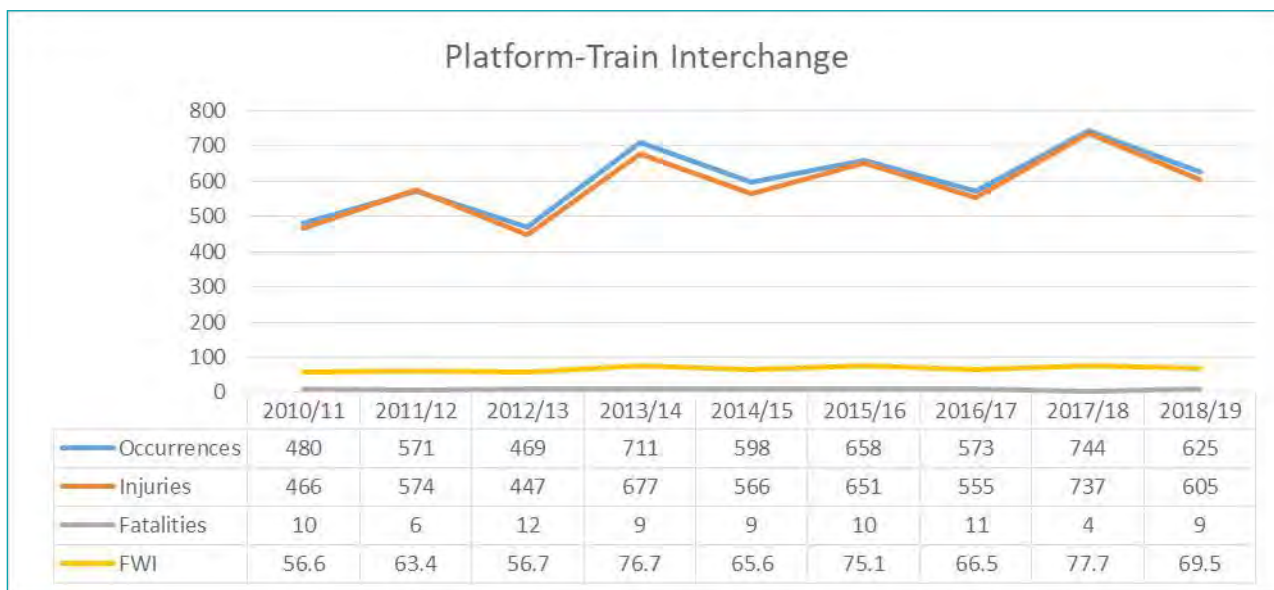


Figure 49: Number of PTI occurrences and related fatalities and injuries time series

## Time of day analysis

The time of day analysis illustrated in Figure 50 indicates that most of the PTI occurrences tend to take place during the morning and afternoon peak hours. The morning peak times that recorded the highest number of occurrences is between 06:00-08:00, whereas the afternoon peak times are between 16:00-20:00. This pattern could be indicative of overcrowding at stations during peak travel hours.

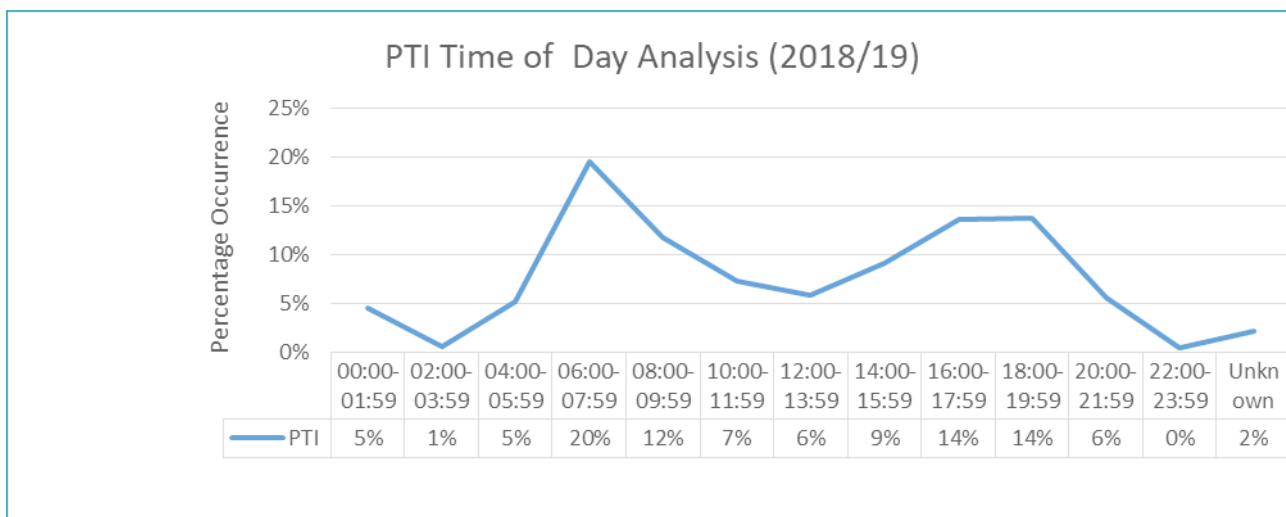


Figure 50: Time-of-day analysis for PTI occurrences (2018/19)

A weekday examination of PTI occurrences shows that the occurrences tend to occur during the week with peak level on Tuesdays and Fridays (Figure 51). Further analysis of the data revealed a decrease in occurrences on Sundays. This pattern was also evident for the people struck by trains occurrence category. This analysis serves to confirm that overcrowding could be major contributing factor to this occurrence category.

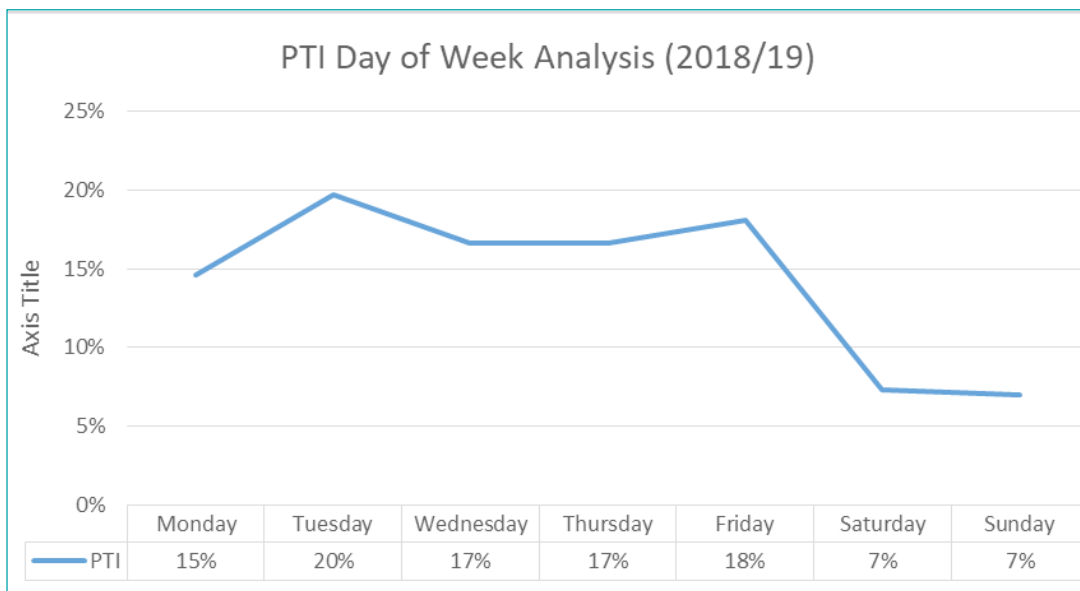


Figure 51: Day-of-week PTI occurrence analysis (2018/19)

## Provincial analysis

Further analysis of these occurrences was done in order to establish within which provinces these occurrences are taking place. The Gauteng province dominated PTI occurrences from 2010/11 to 2018/19, followed by the large metropolitan areas in KwaZulu-Natal and the Western Cape combined (Figure 52). As in the case of people struck by trains, most of the PTI occurrences occur in the Gauteng province. Figure 53 shows there was a slight reduction in Gauteng and a slight increase in the Western Cape in 2018/19.

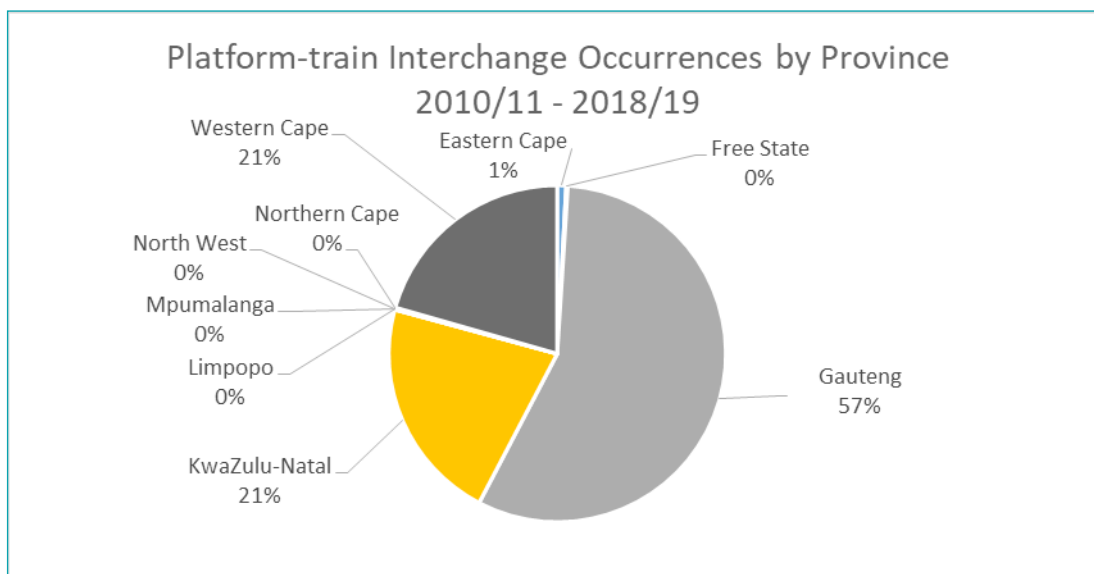


Figure 52: Distribution of PTI occurrences by province for 2010/11-2018/19

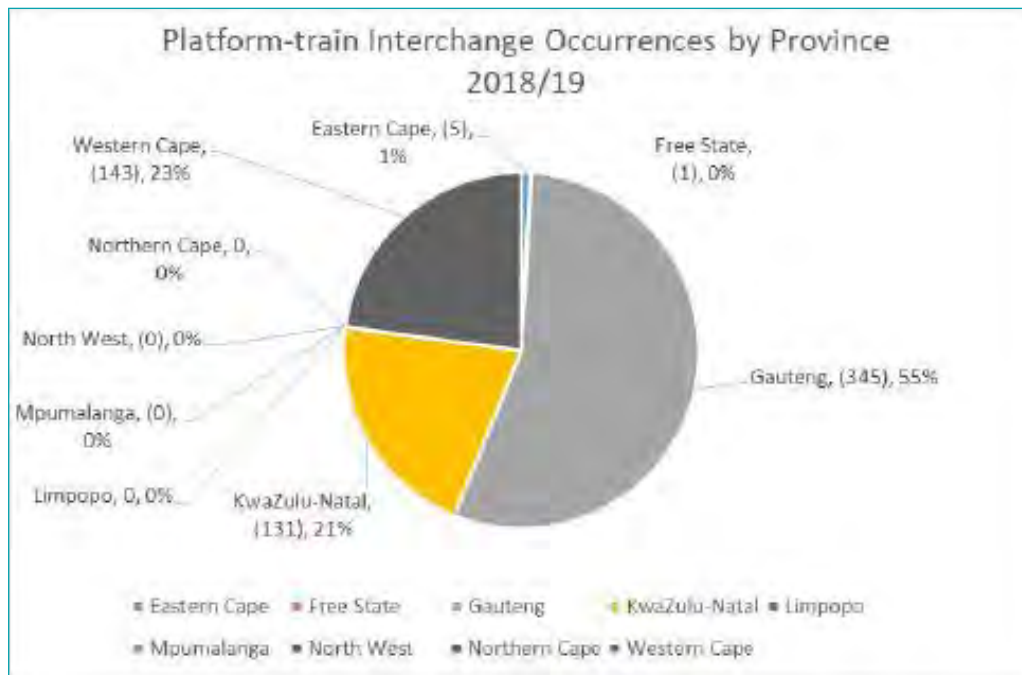


Figure 53: Distribution of PTI occurrences by province for 2018/19

The Gauteng province represents more than half of all PTI occurrences, followed by KwaZulu-Natal and the Western Cape. The three large metropolitan areas represent 99 per cent of the 2018/19 PTI occurrences.

Figure 54 shows despite a 9 per cent reduction in 2018/19 PTI occurrences compared to 2017/18, PTI occurrences increased by 28 per cent since 2010/11. This increase is amplified by a reduction in PRASA train km.

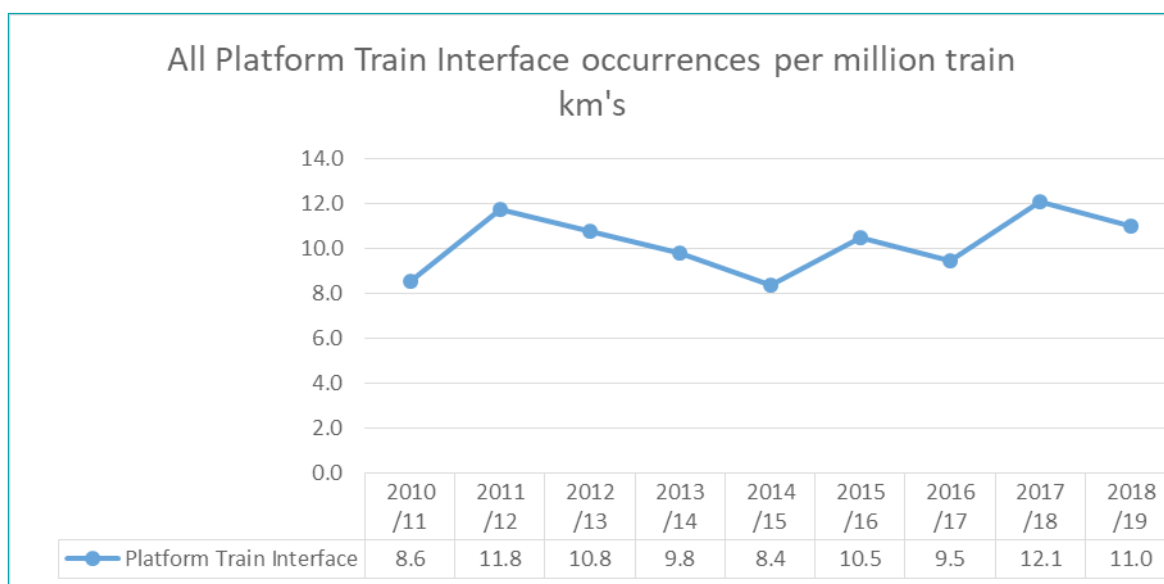


Figure 54: All PT Interface occurrences per million train km





# CHAPTER 8

# RAILWAY SECURITY

This chapter covers assets and human security risks reported in nine categories as stipulated by SANS 3000 as follows:

**Category 1** incidents cover the theft of the following assets, causing an impact on operational safety:

**Category 2** incidents cover malicious damage (vandalism) to the following, causing an impact on operational safety:

**Category 3** incidents cover the following threats to operational safety:

**Category 4** incidents cover the kidnapping of train crews and the hijacking of

**Category 5** incidents cover crowd-related incidents including stampedes.

**Category 6** incidents cover industrial action that causes a threat to safe railway operations or to security.

**Category 7** incidents cover the following personal safety on trains

**Category 8** incidents cover the following personal safety at stations

**Category 9** incidents cover the following regarding personal safety outside station platform areas (in sections between stations, including yards, sidings and depots)

## 2018/19 Noteworthy statistics

- Security-related incidents increased by 20 per cent overall between 2017/18 and 2018/19.
- Compared over the long term since 2013/14, it is fair to state that the 2018/19 levels of all security-related incidents are out of control. An increase of 125 per cent was recorded.
- The overall harm to persons increased by 15 per cent since 2017/18.
- Theft and vandalism account for 88 per cent of all security-related incidents. The operational impact on train operations is significant and could be evidenced by the percentage time that TFR and PRASA operate abnormally.

## Overview performance

Table 13 shows all security-related incidents recorded between 2013/14 and 2018/19. Compared to 2017/18, the RSR recorded a total of a 20 per cent increase in security incidents. This is 97 per cent higher than in 2013/14. When compared over the long term since 2013/14, it is fair to state that the 2018/19 levels of security-related incidents are out of control.



Table 13: Security-Related Incidents recorded for 2013/14 – 2018/19

Reporting Year	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19				18/19 vs. 13/14	18/19 vs. 17/18
South African National Standards (SANS) Category	All	All	All	All	All	TFR	PRASA	Other	All	All	All
1: Theft of assets	3068	4213	3600	4379	4984	3645	2624	22	6291	105%	26%
2: Malicious damage (vandalism)	1019	1094	1158	1162	1717	708	1028	74	1810	78%	5%
3: Threats of operational safety	6	0	2	0	75	62	4	0	66	1000%	-12%
4: Train kidnapping or hijacking	0	0	0	0	0	0	0	0	0	-	-
5: Crowd-related occurrences	7	2	0	0	13	35	0	0	35	400%	169%
6: Industrial action	4	4	1	8	25	26	8	1	35	775%	40%
7: Personal safety on trains	283	516	368	408	398	4	455	2	461	63%	16%
8: Personal safety on stations	247	278	305	312	401	19	395	15	429	74%	7%
9: Personal safety outside station platform area	69	115	86	109	124	27	113	1	141	104%	14%
<b>TOTAL</b>	<b>4703</b>	<b>6222</b>	<b>5520</b>	<b>6378</b>	<b>7737</b>	<b>4526</b>	<b>4627</b>	<b>115</b>	<b>9268</b>	<b>97%</b>	<b>20%</b>

Figure 55 shows that Category 1 theft of assets (68 per cent), Category 2 malicious damage (vandalism) (20 per cent), Category 7 personal safety on trains (5 per cent), and Category 8 personal safety on stations (5 per cent) continue to dominate the number of security incidents. The overall harm to persons (Category 3 to 9) remained at 13 per cent since 2017/18.

### Security-related Incidents recorded for 2018/19



	TFR	PRASA	Other
1: Theft of assets	3116	3032	143
2: Malicious damage (vandalism)	919	847	44
3: Threats of operational safety	27	38	1
4: Train kidnapping or hijacking	0	0	0
5: Crowd-related occurrences	21	13	1
6: Industrial action	17	17	1
7: Personal safety on trains	216	237	8
8: Personal safety on stations	197	223	9
9: Personal safety outside station platform area	70	70	1

Figure 55: Security-related Incidents recorded for 2018/19

The operational impact that 87 per cent theft and vandalism (Figure 56) have on train operations is significant and could be evidenced by the percentage time that TFR and PRASA operate in degraded mode.

### Breakdown of 2018/19 Security-related Incidents by category

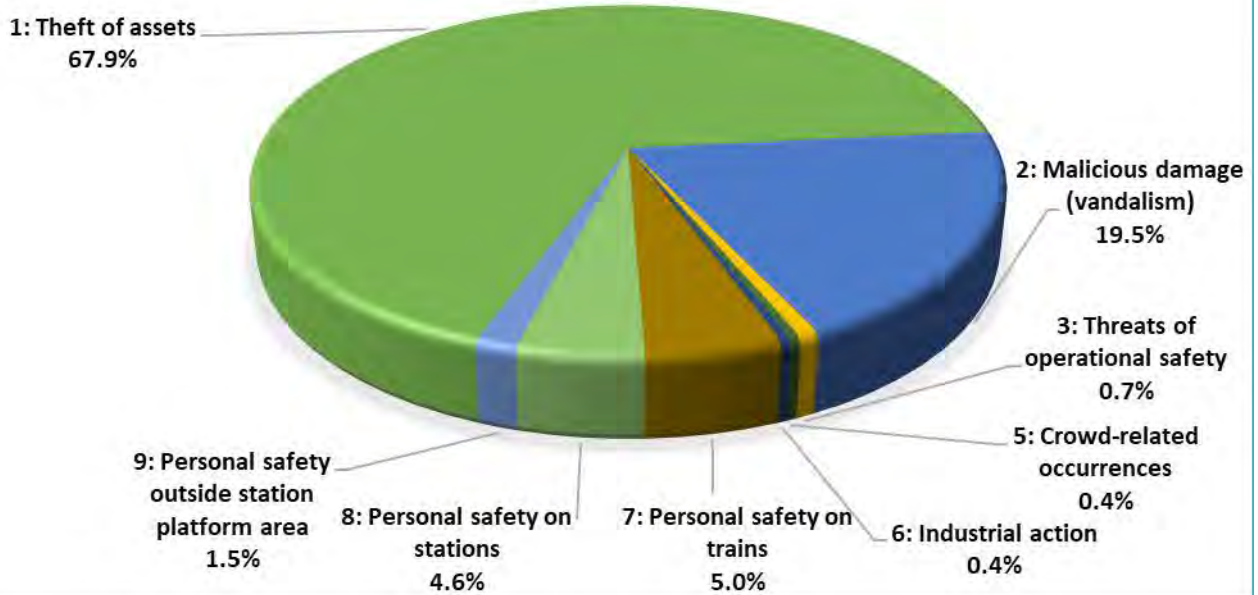


Figure 56: Breakdown of 2018/19 security-related incidents by category

In terms of security-related harm to persons, 2012/13 was the best performing year. Figure 57 shows that both 2018/19 injuries and fatalities increased by more than 400 per cent compared to 2012/13.

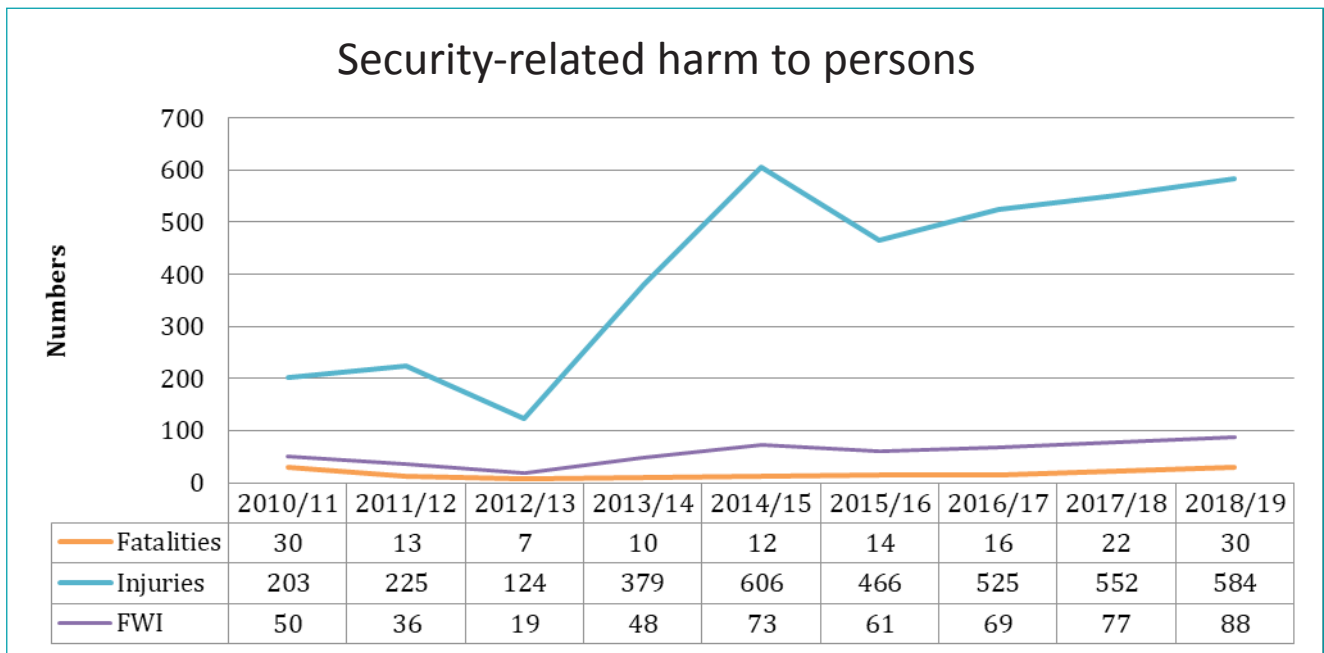


Figure 57: Security-related harm to persons 2010/11 to 2018/19



Table 14 shows the SANS category breakdown of security-related harm to persons in 2018/19.

**Table 14: SANS category breakdown of security-related harm to persons in 2018/19**

Category	Count	Fatalities	Injuries	FWI
<b>Security Incidents</b>	<b>558</b>	<b>30</b>	<b>584</b>	<b>88,4</b>
1: Theft of assets	2	0	2	0,2
1-c: Theft of civil infrastructure components in section	1	0	1	0,1
1-g: Theft of train control equipment (signalling) in section	1	0	1	0,1
2: Malicious damage (vandalism)	4	1	5	1,5
2-a: Malicious damage (vandalism) of rolling stock components in section	3	1	4	1,4
2-c: Vandalism	1	0	1	0,1
3: Threats of operational safety	0	0	0	0
4: Train kidnapping or hijacking	0	0	0	0
5: Crowd-related occurrences	0	0	0	0
6: Industrial action	3	0	5	0,5
6-a: Occurrence where a passenger fell on the platform whilst entraining/detraining a stationary or moving train	3	0	5	0,5
7: Personal safety on trains	268	9	292	38,2
7-a: Murder	3	3	1	3,1
7-b: Attempted murder	7	0	7	0,7
7-d: Assault	159	4	164	20,4
7-f: Aggravated robbery	81	2	99	11,9
7-g: Common robbery	16	0	19	1,9
7-h: Theft	2	0	2	0,2
8: Personal safety on stations	208	12	210	33
8-a: Murder	9	9	0	9
8-b: Attempted murder	14	0	18	1,8
8-d: Assault	113	2	118	13,8
8-f: Aggravated robbery	69	1	71	8,1
8-g: Common robbery	3	0	3	0,3
9: Personal safety outside station platform area	73	8	70	15
9-a: Murder	8	8	1	8,1
9-b: Attempted murder	8	0	10	1
9-c: Rape	2	0	2	0,2

Category	Count	Fatalities	Injuries	FWI
9-d: Assault	23	0	24	2,4
9-f: Aggravated robbery	31	0	32	3,2
9-g: Common robbery	1	0	1	0,1
plus Unspecified events	<b>216</b>	<b>79</b>	<b>156</b>	<b>94,6</b>
plus Safety Occurrences	<b>1641</b>	<b>375</b>	<b>2660</b>	<b>641</b>
All Events	<b>2415</b>	<b>484</b>	<b>3400</b>	<b>824</b>

For 2018/19, Table 15 shows the distribution of theft of assets by province. Table 16 shows the distribution of malicious damage (vandalism) by province.

**Table 15: Distribution of theft of assets by province for 2018/19**

Category 1. Theft of Assets (2018/19)	1-a	1-b	1-c	1-d	1-e	1-f	1-g	1-h	1-i	Grand Total
Eastern Cape	6	8	4	0	12	0	37	4	11	<b>82</b>
Free State	5	2	12	0	16	1	47	6	6	<b>95</b>
Gauteng	196	207	389	50	492	16	1431	29	64	<b>2874</b>
KwaZulu Natal	24	26	122	3	86	19	724	7	28	<b>1039</b>
Limpopo	2	2	15	0	28	6	29	2	33	<b>117</b>
Mpumalanga	18	16	37	4	180	7	381	12	275	<b>930</b>
North West	13	2	27	5	77	3	99	2	6	<b>234</b>
Northern Cape	2	4	7	1	5	0	47	3	6	<b>75</b>
Western Cape	66	41	107	11	31	6	532	20	27	<b>841</b>
<b>Grand Total</b>	<b>332</b>	<b>308</b>	<b>720</b>	<b>74</b>	<b>927</b>	<b>58</b>	<b>3327</b>	<b>85</b>	<b>456</b>	<b>6287</b>

**Table 16: Distribution of malicious damage (vandalism) by province for 2018/19**

<b>Category 2. Malicious Damage (Vandalism) (2018/19)</b>	<b>2-a</b>	<b>2-b</b>	<b>2-c</b>	<b>2-d</b>	<b>2-e</b>	<b>2-f</b>	<b>2-g</b>	<b>2-h</b>	<b>2-i</b>	<b>Grand Total</b>
<b>Eastern Cape</b>	10	7	1	0	2	0	17	2	13	<b>52</b>
<b>Free State</b>	0	0	1	0	4	0	7	0	2	<b>14</b>
<b>Gauteng</b>	157	71	123	11	54	3	226	5	5	<b>655</b>
<b>KwaZulu Natal</b>	70	13	19	3	14	3	189	1	7	<b>319</b>
<b>Limpopo</b>	8	0	2	1	8	0	4	0	1	<b>24</b>
<b>Mpumalanga</b>	5	2	5	0	21	0	41	3	3	<b>80</b>
<b>North West</b>	1	0	10	0	13	4	17	0	0	<b>45</b>
<b>Northern Cape</b>	3	1	1	0	4	0	11	1	1	<b>22</b>
<b>Western Cape</b>	295	28	27	2	25	8	198	4	11	<b>598</b>
<b>Grand Total</b>	<b>549</b>	<b>122</b>	<b>189</b>	<b>17</b>	<b>145</b>	<b>18</b>	<b>710</b>	<b>16</b>	<b>43</b>	<b>1809</b>



# CHAPTER 9

# RAPID RAIL POLICE CRIME OVERVIEW REPORT

The chapter provides a summary of the statistics provided by the Rapid Rail Police in their Crime Overview Report. The report draws a year-on-year comparison of reported security incidents for the years 2017/18 and 2018/19.

## Contact crimes

The South African Police Service categorises data for each year into the categories murder; attempted murder; sexual offences, assault Grievous Bodily Damage GBH; aggravated robberies and common robbery. A total of 2381 incidents were recorded for the 2017/18 year and 2205 incidents for 2018/19. The figures below show contact crimes per category for 2017/18 and 2018/19.

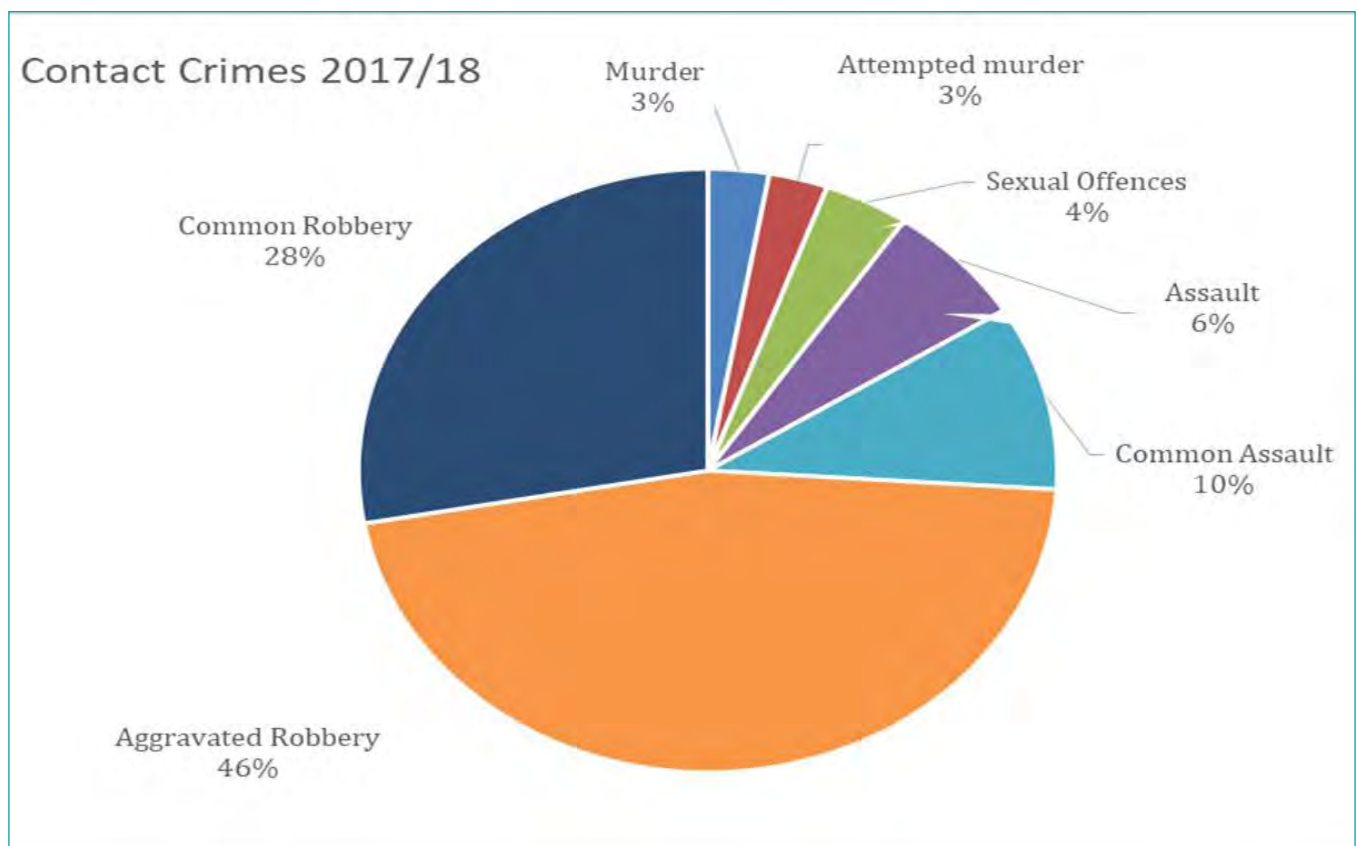


Figure 58: Rapid rail police – contact crime 2017/2018



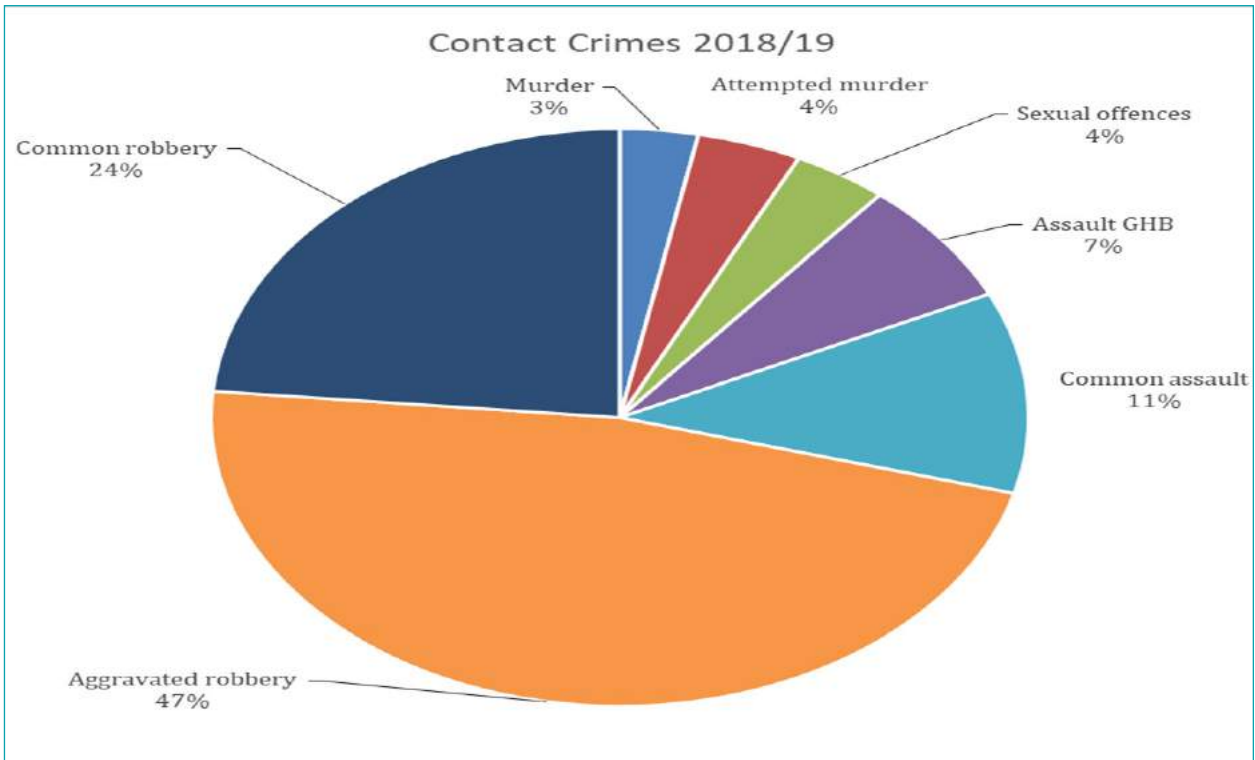


Figure 59: Rapid rail police – contact crime 2018/2019

## Contravention of the Legal Succession Act

Illegal crossing of the railway line is the category that has experienced a significant drop in incidents. A total number of 15626 incidents were recorded for the year 2017/18, which dropped to 4202 in 2018/19. Persons boarding or disembarking a moving train is the second-ranked category with 115 incidents in 2017/18, dropping to 20 incidents in 2018/19.

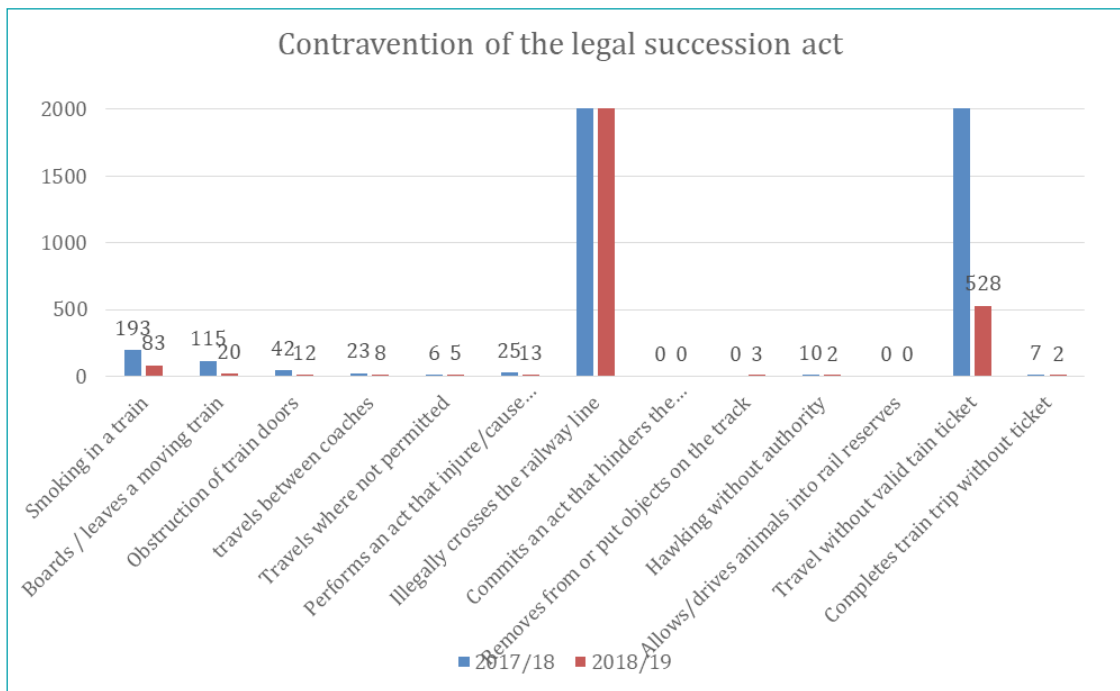


Figure 60: Rapid rail police – contravention of the legal succession Act

## Property-related crimes

There is an increase from 320 incidents in 2017/18 to 349 in 2018/19 in property related crimes. This group is subdivided into burglary at business premises, burglary at residential premises, theft of a motor vehicle and motorcycle, theft out or from motor vehicle and stock theft. Other serious crimes is a category which relates more to the railway environment. Categories include cable theft, infrastructure theft and theft other.

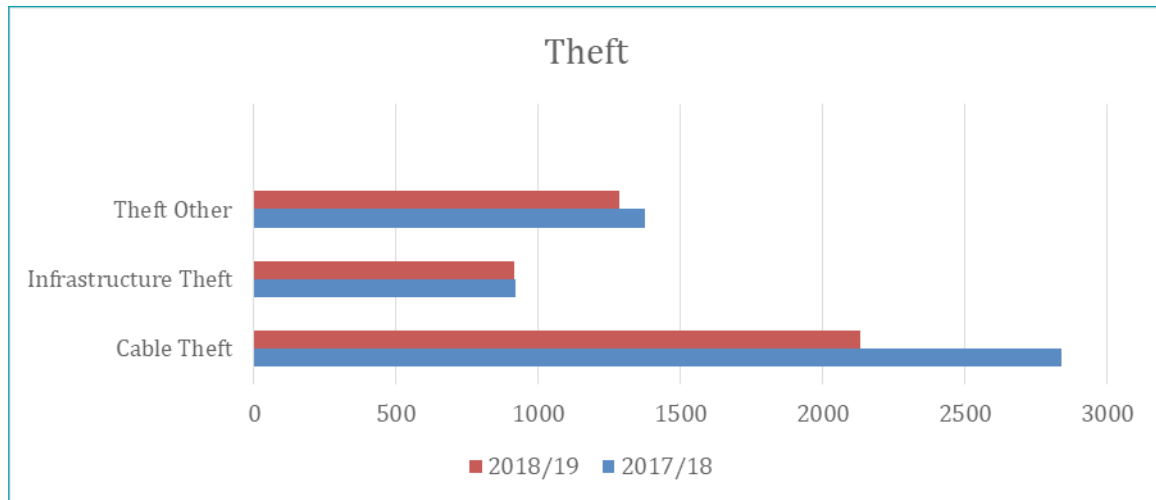


Figure 61: Rapid rail police – property related crimes



The Rapid Rail Police report lists the following challenges and associated risks relating to the rail environment:

**Table 17: Challenges and risk areas – Railway Rapid Police**

<b>Challenge</b>	<b>Risk</b>
Train delays/cancellations / no drivers	Angry commuters lead to riotous behaviour/destruction of property
Unused buildings	Haven for criminals
Inadequate lighting in train and surroundings	Criminals gain access to the rail environment without detection
Tickets not verified/examined	Increased fare evasion
No or lack of sufficient security personnel	Ticket office prone to robbery
Vegetation along and around station overgrown	Creates a safety and security risk
Service roads not maintained	Reaction time delays/areas used as escape routes by criminals/ longevity of vehicles reduces and expensive to maintain
Environment not secured/electrical failures	Infrastructure damage/ theft
Lack of coordination between customer service security and police	Delay in reaction time/vandalism/disruptions
Connecting trains not departing according to schedules	Angry commuters/disruptions/vandalism
Illegal connections	Delays/disruptions
Encroachment of the rail reserve/ lack of fencing	Infrastructure vandalism/collisions/ death
Reaction time of technicians to repair trains	Angry commuters/disruptions/vandalism
Security guards not clearly identified-absence of uniform	Increased fare evasion
Security personnel not vetted	Personnel may not be suitable for employment





# CHAPTER 10

# RSR INTERVENTIONS

The Act states in Section 5 that the objects of the Regulator are to:

- a) oversee safety of railway transport;
- b) promote improved safety performance in the railway transport industry;
- c) develop any regulations that are required in terms of the Act;
- d) monitor and ensure compliance with the Act; and
- e) give effect to the objects of the Act.

In order to fulfil this mandate, the RSR performs the following functions:

- Issues safety permits;
- Conducts inspections and audits;
- Investigates railway accidents;
- Develops regulations, safety standards and related documents which form the basis of the regulatory regime; and
- Issues notices of non-conformances and non-compliances and, in future, will impose penalties for non-compliance with the Act and safety standards adopted by the Board of Directors of the RSR.

This report contributes to the fulfilment of the RSRs mandate by collecting and disseminating safety information relating to safe railway operations.

## Issuing of safety permits

All the active rail operators are required to be in possession of a valid safety permit to legalise their rail operations. In line with the mandate, the RSR continues to identify active rail operators who require safety permits, in order to legitimise their operations. Several projects aimed at increasing the level of industry compliance were successfully completed leading to more operators being issued with safety permits and more interface agreements being entered into by various operators.

The RSR, in terms of section 28(a) and (b) of the National Railway Safety Regulator Act No. 16 of 2002 (as amended) published the determination of the format, form and content of a safety management system that is required for the different categories and types of safety permits as well as the form, content and manner of submission of a safety management system report. All operators are required to submit safety permit applications in compliance with the requirements as set out in the published document.

The following criteria is used to classify railway operators:

- Group A: Train Operators, Network Operators and Station Operators**  
 Railway operators who transport 500 000 tons or more of general goods, 50 000 tons or more of dangerous goods, or passengers.
- Group B: Train Operators, Network Operators and Station Operators**  
 Railway operators who transport between 200 000 tons and 500 000 tons of general goods, fewer than 50 000 tons of dangerous goods or tourists.
- Group C: Train Operators, Network Operators and Station Operators**  
 Railway operators who transport fewer than 200 000 tons of general goods.

The table below depicts the number of permit holders per region and class for the 2018/19 Financial Year:

**Table 18: Number of safety permit types issued**

Province	Permit Class				Grand Total
	A	B	C	T*	
Eastern Cape	9	8	8	1	26
Gauteng	24	17	29	0	70
KwaZulu-Natal	20	9	26	0	55
Mpumalanga	33	8	11	2	54
Western Cape	15	22	15	1	53
<b>Grand Total</b>	<b>101</b>	<b>64</b>	<b>89</b>	<b>4</b>	<b>258</b>

\*: Temporary Safety Permit: Temporary safety permits are issued only to currently active railway operators for operations not yet covered by an existing permit as an interim arrangement pending the application and issuing of a Group A, B or C Safety Permit.

## Safety Management System development

In terms of section 28 of the Act, the Regulator is required to determine the form and content of a SMS that is required for the different categories and types of safety permit and the form, content and manner of submission of a SMSR. To this extent, the Regulator published the determination of the format, form and content of a SMS that is required for the different categories and types of safety permits as well as the form, content and manner of submission of a SMSR. This determination is published for compliance and general information with the overall purpose of providing operators with a formal framework to integrate safety into day-to-day railway operations and to achieve their business objectives in a safe manner.

In addition, the RSR conducted operator awareness training in Cape Town, Centurion, Durban, Ermelo and Kimberley in order to facilitate the implementation of the SMS and the SMSR requirements.

In order to address the train collision risks arising from manual train authorisations during degraded mode of train operations the Regulator drafted a communications protocol with the assistance of the railway industry. The purpose of the Verbal Safety-Critical Communication (VSCC) protocol is to provide for a structured communication framework for effective and safe communications between train drivers and train control officers during railway operations and to standardise the approach to verbal safety communications between employees involved with safety critical tasks within railway operations in South Africa. The draft VSCC protocol was subsequently completed and published in the Government Gazette for public comments on 29 March 2019.

Another area of concern for the Regulator was the management of risks associated with inter-operability between operators on the shared railway network. It is for this reason that the Regulator established a working group on Interface Management. This working group was tasked with the development of a framework detailing the measures to be taken in order to manage the risks associated with railway operations on the shared network with other operators. The proposed framework shall also provide a standardised approach for operators to conclude the interface agreements and manage interoperability and thus reduce railway occurrences attributable to interoperability errors.

To enhance the implementation of a harmonised railway safety regime within SADC, the RSR together with SUMATRA facilitated and led presentations/awareness training on railway safety standards for all the SARA members. The sessions were conducted in August at the Julius Nyerere International Convention Centre in Tanzania and were intended to familiarise the members with the adopted standards.

## Education and awareness

During the period under review, the RSR employed several interventions to positively impact the state of safety of the rail industry. Among these, the RSR extensively raised awareness to enhance understanding of rail safety and promoted safe railway

behaviour. All the RSR's public education interventions were aimed at raising awareness through outreach engagements, educational initiatives and programmes. The RSR embarked on the following during the year under review.

## Public service announcement

The RSR developed a Public Service Announcement (PSA) to profile the mandate of the RSR and to create awareness about rail safety. The PSA was developed with the intent to place the spotlight on railway safety, particularly throughout the month of October 2018 and endeavoured to position the RSR as the custodian of railway safety in South Africa, while promoting the philosophy that railway safety is everyone's responsibility.

The RSR developed a proactive, mass marketing campaign to position itself as an effective regulating authority that is committed to ensuring railway safety and holding all parties who inhibit this goal accountable.

The PSA created brand visibility and recognition and gave stakeholders the impetus to take steps to drastically improve the quality and safety of commuter railway transportation.

The SABC was selected as the medium to broadcast the PSA to the RSR's target audience. Television platforms provided by the SABC exposed the RSR's message to millions of commuters. The PSA was also aired on community-based television stations aimed at the greater Cape Town metropolitan area, as well as Transit Ads which targeted the commuting public who uses taxi's, buses and trains in all the big metropolitans. As a result, the RSR's messages reached millions of commuters.

The PSA called upon the youth to get involved by developing their own railway safety songs. The development of the Train Tracks competition enabled the RSR to secure interviews on popular TV magazine and youth entertainment shows, thereby exposing its publicity campaign to a wider target audience.

Social media platforms such as Twitter, Facebook and YouTube were used as additional distribution mechanisms and allowed interested parties the opportunity to interact with the PSA and the RSR.



## Safety awareness campaigns

The RSR conducted 22 education and awareness campaigns during the period under review. The campaigns were multi-disciplinary in nature and was conducted in partnership with key stakeholders such as PRASA, Transnet Freight Rail, Rapid Rail Police, municipalities and commuter forums among others.

The campaigns focused on some of the RSR's focus areas i.e. level crossings, people struck by trains and platforms-rain interface. To measure the impact of the campaigns, pre and post campaign evaluations were conducted at certain campaigns.

One such example is a safety awareness campaign conducted at the Pienaarspoort level crossing in Mamelodi on 25 February 2019.

The campaign was conducted in partnership with PRASA, TFR, United Community Voices, Rapid Rail Police and the Tshwane Municipality, represented by the Office of the Ward Councillor. The level crossing warranted the intervention as it had recorded more occurrences in Gauteng during the period under review.

A pre-campaign evaluation was conducted at the level crossing prior to the activation, with a post-campaign evaluation conducted at the level crossing seven days later.

During the campaign it became apparent that due to the growing human settlements in the area, the Pienaarspoort station, which is located fewer than 500 metres from the crossing was strained and could not service the multitudes who were boarding on a daily basis. There was also a high number of motor vehicles crossing at the level crossing, without observing the signs and rules of the crossing. Complacency was prevalent in general interaction with the level crossing.

One-on-one interactions were conducted with commuters, with the aim of establishing their knowledge and understanding of rail safety. During the interactions, commuters were requested to complete a brief questionnaire on level crossing safety. A total of 500 participants were targeted for the survey.



The rest of the awareness campaigns conducted during the period under review are listed below:

**Table 19: Safety Awareness Campaigns Conducted**

Name of awareness campaign	Area	Focus area
125th Ghandi commemoration	KwaZulu-Natal	Promotion of RSR as a rail safety authority
2018 DoT Budget Vote	Western Cape	People struck by trains, platform-train interface and level crossing safety
Aloe JSS & Luzuko School awareness campaign	Western Cape	People struck by trains, platform-train interface and level crossing safety
Butskop Level Crossing	Western Cape	Level crossing safety
Groutville Level Crossing	KwaZulu-Natal	Level crossing safety
Interntional Level Crossing Awareness Day (ILCAD)	KwaZulu-Natal	Level crossing safety
Leralla Station	Gauteng	People struck by trains and platform-train interface
Transport Ministerial Imbizo	KwaZulu-Natal	People struck by trains, platform-train interface and level crossing safety
Wasbank Community Awareness	KwaZulu-Natal	People struck by trains, platform-train interface and level crossing safety
Addo Level Crossing Campaign	Eastern Cape	Level crossing safety
East London Awareness Campaign	Eastern Cape	People struck by trains, platform-train interface and level crossing safety
New Brighton Station Activation	Eastern Cape	People struck by trains, platform-train interface and level crossing safety
Retreat Station	Western Cape	People struck by trains, platform-train interface and level crossing safety
Rolle Level Crossing	Mpumalanga	Level crossing safety
2018 DoT Imbizo	Western Cape	People struck by trains, platform-train interface and level crossing safety
Dobsonville Level Crossing	Gauteng	Level crossing safety
PSA Report	All Regions	People struck by trains, platform-train interface and level crossing safety
Rail Safety Week-long Campaign	All Regions	People struck by trains, platform-train interface and level crossing safety
Sinako Safety Campaign	Western Cape	People struck by trains, platform-train interface and level crossing safety
Transnet Employee Campaign	Gauteng	Promotion of RSR as a rail safety authority
Kenilworth Level Crossing	Western Cape	Level crossing safety
Pienaarspoort Level Crossing	Gauteng	Level crossing safety

## RSR partnerships

The future of the South African Railway Industry will be exciting and challenging for. The spotlight is firmly on the sector with the massive investments in infrastructure and rolling stock which are underway. All these developments require a Railway Safety Regulator that is vigilant, innovative and has strong partnerships with key institutions in order to ensure that the decisions made today and the steps to be taken tomorrow will help to positively influence the safety of railways for many years to come.

This is why the RSR therefore, decided to partner with the University of Pretoria in order to ensure the development of high-level research skills and human capital in order to address South Africa's transformation imperatives.

The aim of the partnership is to achieve the following:

- To further develop a Railway Safety Inspector qualification, building upon an RSR initiative which has already led to the registration of a Railway Safety Inspector qualification curriculum with the South African Qualifications Authority (SAQA).
- To provide continued training and education to Engineering Practitioners and Railway Safety Inspectors in the Railway Engineering Industry.
- To liaise with national and international experts in the field of railway safety.
- To undertake research in railway safety, with the view to integrate the results of such research and liaison into the curriculum of the programme.

The University undertook to develop the Railway Safety Inspector qualification. The qualification will be a combination of formal training and practical workplace experience with a multi-disciplinary focus. The current short course curriculum of the University will be used where applicable and new modules/courses will be developed where necessary.

To date, several short courses offered by the University have been attended by RSR staff together with other attendees from the South African railway industry.

The RSR is also collaborating closely with the Engineering Council of South Africa (ECSA) towards ensuring that the RSR technical/engineering staff obtain professional registration in order to continue to approach their work in a professional manner while also attending to continued professional development initiatives and programmes. Through this collaboration some RSR staff have already been registered as professionals, while others are registered as candidates.

## Offences and penalties

The Regulator has among other enforcement tools, penalties which are key in ensuring that the RSR attains its vision of "Zero Occurrences". The Regulator implemented penalties to enforce compliance with the provisions of the Act, Regulations and Standards.

Penalty Fee Regulations were first enacted on 18 February 2011. These were later amended on 20 March 2013.

The Regulations are empowered by section 45A (1) of the National Railway Safety Regulator Act no. 16 of 2002, as amended, which requires the Minister of Transport to make regulations to provide that, persons who fail to comply with any provision of the Act, Regulations or Standard made or imposed or any condition imposed in terms of section 24 of the Act, must pay one or more penalties to the Regulator.

The purpose of the regulations is twofold. Firstly, to promote, improve and achieve sustained compliance with the Act so that incidents where penalties are imposed will be reduced over a period and lastly, to promote safe railway operations. This is clearly stated under section 45A (2) of the Act, which states that the making of the regulations and the imposition of penalties are on the understanding that the Regulator will strive to improve compliance with the Act so that incidents where penalties are imposed, will reduce over time.

Regulations prescribe maximum penalty amounts for different categories. For example, Category 1 prescribes a maximum penalty amount of R5 000 000 (5 Million) for contraventions that impact or potentially impact on operational safety. These contraventions relate to operating without a valid safety permit, failure to comply with conditions of a safety permit, failure to comply with the directive issued by a railway safety inspector and many more.

Whereas, Category 2 prescribes the maximum penalty of R1000 000 (1 Million) for contraventions that impact on the Regulator's ability to administer the Act. These contraventions relate to failure to inform the Regulator of significant changes impacting on the operator's Safety Management System, failure to provide the Regulator with any information requested within the specified timeframes.

The implementation of the penalty regime has proved to be effective in that there has been an improvement in adherence to the regulatory framework by the operators. This can be attributed to a significant reduction in the number of contraventions and penalties imposed on a year-to-year basis. A case in point, in the 2018/2019 Financial Year, only six operators that found to have contravened the Act and as a result were penalised.

## 2018/19 Railway operations safety audits and inspections

The RSR decentralised its operational offices leading to the creation of the three regional offices during the 2012/13 Financial Year. These offices were the KwaZulu-Natal Region (covering KwaZulu-Natal and the Eastern Cape), Western Cape Region (covering the Western Cape, Northern Cape and Free State) and Gauteng Region (covering the North West, Limpopo, Mpumalanga and Gauteng).

During 2014/15 reporting period, this structure was revised and consequently two additional regional offices were created. As of the 2014/15 reporting period, the RSR regional offices were KwaZulu-Natal (covering KwaZulu-Natal), Western Cape Region (covering Western Cape and Northern Cape), Gauteng Region (covering North West and Gauteng), Mpumalanga Region (covering Limpopo and Mpumalanga) and the Eastern

Cape (covering Free State and Eastern Cape). The RSR conducted comprehensive SMS baseline audits and inspections on the railway activities of operators to report on the compliance or otherwise by the industry with the regulatory framework.

The objective of these activities was firstly to measure compliance by the rail industry to the requirement of relevant standards and legislation. Secondly, to guide the process of mapping out strategies to address identified inadequacies or non-compliances in order to contribute more effectively towards the improvement of railway operational safety.

For the year under review, the RSR nationally issued a total of 42 Improvements Directives (IDs) of which 20 have since been closed. The latter means that the relevant operators has implemented work required to meet the instructions in the improvement directive. The rest of the IDs are being followed up when the planned corrective action completion date arrives.

During the 2018/19 reporting period, the RSR conducted a total of 97 audits and 201 inspections. The Gauteng region conducted 55 audits and 92 inspections, the KZN region conducted 13 audits and 26 inspections, the Western Cape region conducted 16 audits and 28 inspections, the Mpumalanga region conducted 7 Audits and 32 Inspections while the Eastern Cape region conducted 6 Audits and 23 Inspections.

## RSR 2018/19 Investigations

During the 2018/19 reporting period, the RSR conducted 31 investigations across the railway industry. The investigations were on collisions, derailments, level crossing incidents and people struck by train. The analysis of the investigation findings indicates that the human factor elements were the largest contributor to railway accidents. Human factors contributed to 66.7 per cent of all the findings in the 2018/19 Financial Year. Closer examination revealed that the biggest contributing elements within human factors are "Non-adherence to Standard Operating Procedures (SOP)" at 21 per cent and "Negligence" at 11 per cent. It has been established that there is a link between these findings and that the enforcement of safe working procedure needs to be driven by line managers to ensure compliance.

The table below highlights the name of the operator, short description of the occurrences and the summary of the RSR's investigation findings:

**Table 20: Summary of investigations findings**

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
PRASA	Elandsfontein collision investigation	On 01 June 2017 at approximately 06h37, Metro Express Train 0600 from Pretoria en-route to Johannesburg collided with Metro Train 1817 which was moving out of the Elandsfontein yard en route to Leralla station.	<p>Failure by PRASA train control personnel to adhere to the requirements of the Train Working Rules and the General Operating Instructions.</p> <p>PRASA Elandsfontein train control personnel embarked on abnormal working process plagued with numerous poor safety defences/uncontrolled risks, routine violations and lacking several key safety procedures.</p> <p>The handover between the night and day shift TCOs was not properly executed.</p> <p>Recording of authorities in train authority register not consistently adhered to in accordance with requirements of the Train Working Rules and the General Operating Instructions.</p> <p>Train 0600 was travelling at a speed higher than the prescribed speed of 30 km/h which is mandated during abnormal working conditions.</p> <p>Poor management and inadequate staffing of the CTC and control cabins resulted in weaknesses in the supervision of TCOs and deviations to the Standard Operating.</p>	<p>Non-adherence to SOP</p> <p>Lack of SOP</p> <p>Non-adherence to SOP</p> <p>Non-adherence to SOP</p> <p>Over speeding</p> <p>Poor supervision</p>

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Alicedale derailment	On 03 February 2017, TFR Train No. 808941 with 44 containerised manganese wagons destined for Mahikeng derailed between Saltair and Blinkof station at kilometre 63, between mast pole 20 and 23.	The train driver failed to adhere to speed restriction limits on the affected area. The train driver failed to adhere to the applicable speed limits applicable to the train.	Non-adherence to SOP
			No temporary speed boards were put on site at the affected area of track.	Inadequate signage
			Hot box detector alarm was muted in the CTC. This resulted in the alarm to be attended to hours after the derailment.	Non-adherence to SOP
			The driver was over speeding on most of the area where there were temporary speed restrictions and the TCO could not pick up that the train was exceeding the temporary speed restrictions.	Over speeding
			There are too many speed restrictions between Port Elizabeth and Letterman. There seem to be no improvement in addressing the infrastructure track deviation.	Poor maintenance
			No adherence to trolley inspections and Footplate inspections by Perway Department.	Poor maintenance
TFR	Train derailment between Tarlton-Magaliesburg	On 13 April 2017 at approximately 06h32, vacuum brake train No. 7230 was travelling from Krugersdorp en route to Magaliesburg when it derailed at kilometre point 29/5 with wagon F2LTJ 81042418. The train consisted of 4x34 diesel locomotives and 33 wagons, where 31 wagons were loaded with maize and two wagons were empty.	Interviews and documents revealed that a temporary speed restriction of 15km/h was imposed after the derailment that occurred on the 28 September 2016 at Kmp 29 - 31 between Tarlton - Magaliesburg.	Poor maintenance
			There were mud pumps on the track within the cutting which was a sign of failing formation caused by an ineffective drainage system at Kmp 29- 31 between Tarlton and Magaliesburg.	Poor maintenance
			The train crew tested negative for alcohol abuse but there was no signature from the Section Manager to verify tests of the train crew at sign on/off.	Human Factors

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Kalbaskraal side collision	On 26 July 2018 at approximately 00h07, two TFR trains no. 1282 and 1494 collided near Kalbaskraal station in the Western Cape. The collision occurred near the manually operated points just outside Kalbaskraal station. Train 1282 was made up of two diesel locomotives hauling 23 cement loaded wagons and train 1494 was made up of two diesel locomotives hauling 17 wagons loaded with dolomite stones.	Train 1494 pushed back and reacted to an instruction which was meant for Train 1282.	Non-adherence to SOP
			The tumbler points were not locked.	Non-adherence to SOP
			The derailed locomotives were not cleared from the occurrence site.	Non-adherence to SOP
			The train crew members stated that they were not aware of the procedure to push back trains in Kalbaskraal triangle.	Poor supervision
			The procedure of pushing back trains at Kalbaskraal is not covered in the circular provided to the RSR.	Lack of SOP
PRASA	Centurion derailment	On 01 October 2017 at approximately 16h57 a TFR air brake train No. 8910 derailed on the trailing points No. 3421W between Centurion and Sportspark train stations in Gauteng.	There is a shortage of personnel to execute track maintenance work, for example there is quality control which is supposed to be performed when maintenance work has been completed but this does not happen.	Shortage of staff
			The Rolling stock Department did not respond to the occurrence site to retrieve data in order to share it with the investigation team at the occurrence site. The investigation was finalised without determining the train speed.	Non-adherence to SOP
			The investigation reveal that the rail block joint had two bolts and one was found loose. This led to instability of a railway network.	Poor maintenance
			The on-track machines had not been operating as planned in the Centurion section.	Poor maintenance

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
PRASA	President station derailment	On 17 January 2018 at approximately 07h50 Metro train T0625 from Johannesburg en route to Pretoria, derailed over 28 points at Germiston West station. There were passengers in the train when it derailed in the section.	The technical worker used the wrong size scotch block to scotch the points.	Lack of spares
			The size of the wedge that was used was not the normal size that is usually used. This led to an opening on the points blade on the 3 <sup>rd</sup> - 4 <sup>th</sup> sleeper.	Lack of spares
			The Signals Department does not have enough points clamps, Therefore, scotch blocks are used instead of clamps.	Lack of spares
			The Signals Department does not have a sufficient resource management system. The personnel do not have enough functional and good conditioned tools.	Lack of spares
			There is no established standard for scotch blocks. Departments within PRASA have different scotch block sizes.	Lack of spares
TFR	Welgedagt derailment	On 10 March 2018 at approximately 11h15, TFR train 9980 derailed with two 36 class diesel locomotives and six loaded wagons. The train was coming from Welgedagt en route to Geduld and was loaded with ammonia.	The vegetation in the vicinity of the occurrence was overgrown.	Poor maintenance
			The anti-vandal springs were not installed in every sleeper and on both sides of the rail.	Lack of spares
			There was rubble left next to the track after perway repairs were done.	Lack of SOP
			The train driver performed CPR on the train assistant.	Human Factors
			The train driver was travelling above the speed restriction on the day of the occurrence.	Over speeding



Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
PRASA	Buttskop level crossing	On 27 April 2018, at approximately 05h46, a Metrorail passenger train No 3200 travelling from Strand to Bellville collided with a bakkie at the Buttskop level crossing in Blackheath, Cape Town. There were seven occupants in the bakkie and all were fatally injured. The train was travelling at a speed of 82 km/h on a railway line which has a section speed of 90km/h.	The trunk radios and recorders at the CTC were not working on the day of the occurrence.	Poor maintenance
			The cable was stolen three times in one week. There is a problem of vandalism in the area.	Cable Theft
			The technicians have not been formally trained to conduct cable repairs. Cable training has been identified as a skills gap on the personal development plan of the technician.	Lack of training
			There is a shortage of staff for personnel to effectively attend to faults.	Shortage of staff
			Personnel have not been tested for fitness of duty since 2012 which could result in decreased health and productivity.	Human Factors
			The bakkie driver acted in an unsafe manner and did not ensure that the level crossing was safe before crossing.	Negligence
			Some road markings are fading.	Poor maintenance
			The vehicle driver failed to observe the level crossing signage and collided with the train.	Negligence

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Groutville level crossing	On 14 April 2018 at approximately 07h54 a TFR Train No.5906 collided with a private vehicle at Groutville level crossing at kilometre point 113/435 in KwaZulu-Natal. The train consisted of two 44DE locomotives hauling a mix of 27 tanks and container type wagons. The train was travelling on the down line coming from Mandeni en route to Durban station.	The train crew failed to protect the train after the incident.	Non-adherence to SOP
			The vegetation and stockpile of the ballast next to R1/W404 combination sign was obstructing the visibility of the oncoming trains as observed on 16 April 2018 during the inspection. The stockpile was caused by poor housekeeping after maintenance was conducted.	Poor maintenance
			There was no evidence that the risk assessment was conducted prior to the incident. The operator did not provide any evidence as requested by the RSR.	Non-adherence to SOP
			School children and pedestrian were walking on the railway line and not behaving safely in the presence of a moving train.	Negligence
			On the day of the incident, there was a speed restriction board of 50 km/h on the section before the level crossing. The CPU report shows that the train was travelling at 55km/h at the time of the incident.	Over speeding
			The vehicle driver failed to observe the road and level crossing signage by not stopping at the stop sign, thereafter, colliding with the train.	Negligence



Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Vlakdrif level crossing	On 12 May 2018 at approximately 15h27, TFR vacuum train no 3018 from Tarlton en route to Mahikeng collided with a private vehicle at a tarred level crossing between Magaliesburg and Vlakdrif stations in the North West province. The vacuum train consisted of four 34 class diesel locomotives and two loaded fuel tank wagons. The section speed for vacuum trains in the Vlakdrif area is 60km/h.	The overgrown vegetation at the level crossing created poor visibility for the vehicle drivers. The condition assessment conducted at Vlakdrif level crossing did not highlight the unacceptable vegetation conditions.	Poor maintenance
			There was no evidence of level crossing awareness being conducted the Vlakdrif level crossing.	Non-adherence to SOP
			The road surface was in a poor condition. The road markings have faded, uneven blocks, rumble strips have flattened down and road edges were damaged.	Poor maintenance
			Track Inspector did not receive specific training or a clear guideline on conducting quarterly inspections at the level crossings.	Lack of training



Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
GAUTRAIN	Gautrain run-away derailment	On 07 February 2018 at approximately 00h11 Bombela Operating Company (BOC) train 301006 was stuck on section due to overhead power failure. There were no passengers in the train except the personnel from Bombela Operating Company.	The OCC controller was taken off duty three days after the incident. He was not removed from duties immediately after the incident as per the requirement of the Human Factors Standard (SANS 3000 – 4).	Human Factors
			Inadequate training or awareness on the role of the sign on/off procedure. The OCC controller declared that he was fit for duty for three days while he was still reeling from the events of the incident.	Human Factors
			There is no diesel locomotive for shunting the trains in the mainline and the yard. The run away train. Train 301006, indicates that the TSR is not capable of applying sufficient brakes to stop the train.	Lack of SOP
			Defects were noted on the inspection list of TSR 340. The outriggers were reported as leaking oil in the seven pre-use inspection lists recorded between August 2017 and February 2018. Specifically, the front right outriggers and the front left light were reported as either cracked or leaking oil.	Poor maintenance
			Personnel interviewed mentioned that there was no prescribed speed for shunting while using the TSR. It was done only based on experience.	Lack of SOP

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
IMPALA PLATINUM	Collision of locomotive 7 and locomotive 3 at 4 bin area	On 07 June 2017 at approximately 04h00, locomotive seven collided with locomotive three at four bin offloading area.	The loco shunter did not follow the SOP / SWP 16.2 Propelling of hoppers "The train driver assistant or shunter, with due consideration for his own safety, must proceed the movement on foot and ensure the lines is clear and points are correctly set for the movement".	Non-adherence to SOP
			The TCO was required to continue with his duties after the accident. He was not relieved from his duties after the incident.	Human Factors
			Substance abuse testing was not conducted for the train controller after the occurrence.	Human Factors
			Evidence from the voice logger indicated that the signal was red, and an instruction was issued by the train controller to stop, but the driver of loco seven disregarded the instructions from train controller and ignored caution from shunter, thus contravening the SOP/SWP.	Non-adherence to SOP
			The functionality of the gate system does not prohibit entry of other locos while the offloading area is occupied. Consequently, it does not mitigate the risks of locos entering the offloading area while the offloading area is occupied.	Poor design
			Breakdown in communication between the TCOs. After the TCO at Driehoek was notified of the failer of Train 0317 at Geldenhuis station, he did not alert the TCO at Cleveland and still acknowledged that Train 0323 could be sent. The procedure with regards to the issuing of SD2 authorities was not observed between the TCOs.	Poor communication

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
PRASA	Geldenhuis station collision	On 09 January 2018 at approximately 07h35, Train 0323 collided into the rear end of Train 0317 at Geldenhuis station. The resulted in the derailment of a plain trailer number 12809 of Train 0317. The trains were en route to Springs from Johannesburg station.	The train driver of Train 0323 took over the train with a faulty speedometer. As a result, she was not aware of the speed she was travelling.	Negligence
			The train driver of Train 0323 failed to observe the speed restriction of 30km/h as required during manual authorisation. The train driver was travelling at a speed of 66km/h.	Negligence
			There was no working instruction, circular or notice that guided the method working on 09 January 2018.	Lack of SOP
			There was no supervision for abnormal working due to the shortage of Section Managers.	Poor supervision
			The fitness for duty of the TCOs was not verified at sign on by the Section Manager. The procedure to ensure that the TCOs were fit for duty was not followed.	Human Factors
			The TCO at Driehoek was allowed to continue with work after the occurrence. He was taken off duty in the afternoon.	Human Factors
			The Metro guard of Train 0317 failed to afford the protection of the train as per Train Working Rules.	Non-adherence to SOP
			Train 0315 passed signal BIR2036 at danger and subsequently ran through point set 2037.	SPAD

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
PRASA	Benoni derailment	On the morning of 23 January 2018, Metro Train 0315 en route from Johannesburg to Springs derailed over a set of points in the section between Dunswart and Benoni. Train 0315 had left Johannesburg with existing faults, and due to the non-availability of technicians to repair the train set, the train driver was advised to take the faulty set to Springs where the faults would be attended to.	Train 0315 passed signal BIR2036 at danger and subsequently ran through point set 2037.	SPAD
			After running through the set of points, a reverse movement was initiated and the train derailed.	Negligence
			After the train failed in the section, the train driver failed to inform the CTC so that further instructions could be given.	Non-adherence to SOP
			After the TCO established that the train had failed in the section, he set a route for another train (0317), but failed to cancel the manual authority already given to Train 0315.	Non-adherence to SOP
			Breakdown in communication-after the TCO established that Train 0315 failed in the section, no clear instruction was given to the driver, except a casual mention that there is a train waiting at the platform in Dunswart.	Poor communication
			After the successful reset of the rear motor coach, the train crew decided to push from the rear without advising the CTC of this arrangement.	Negligence
			The crew decided to push the train from the rear without following proper procedures.	Negligence
			The language policy was not observed in the communication between the TCO and the driver.	Non-adherence to SOP

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
PRASA	Cape town station derailment	On 06 February 2018 at approximately 08h48, PRASA Train 3546 derailed at Cape Town station while entering platform 22.	Middle motor coach No. 13380 derailed with wheel 5 and 6 due to a loose tyre while entering platform 22 at the Cape Town station. There is a high risk of derailments as a result of a loose tyre when a train is running at high speeds. There were a sub-standard monitoring and inspection on the wheels.	Poor maintenance
			The train crew and investigation team were not tested for alcohol at the occurrence site.	Non-adherence to SOP
			TCO authorised the train without ensuring the points are correctly set.	Non-adherence to SOP
PRASA	Crown station derailment	On 09 October 2017 at approximately 17h15, train 9619 en-route from New Canada to Westgate derailed at Crown station. The train derailed with one set of wheels on the leading motor coach 13667 over the facing points 27B after being authorised by the train control officer.	Points no 18, 23 and 27 had been faulty for more than two years without being repaired.	Poor maintenance
			There was no person supervising the TCO.	Poor supervision
			No drug testing records from after the incident were provided.	Human Factors
			A drainage problem was observed at crown station next to the set of points.	Poor maintenance
			Track circuits 37A and WTS2 were defective and were not reported.	Poor maintenance
			After the derailment, only the bolts that were damaged were repaired, the missing bolts were not replaced	Poor maintenance
			There were severe chip marks on the switch blade and this was picked up by Track Inspectors during the turnout inspection. There was no proper communication of the defects from Track Inspectors and the Maintenance Manager.	Poor maintenance



Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Elsburg train derailment	On 06 March 2018 at approximately 13h40, TFR Train 8922 hauling 50 containerised wagons derailed with three 18E locomotives and one wagon at Elsburg station. The train was coming from Newcastle en route to City Deep. The point of derailment was established to be at kilometre four between mast-pole 25 and 26.	A general shortage of staff was noted that resulted in the personnel to adequately execute their duties due to work overload. As a result, personnel were not able to complete all planned tasks. The presence of a high number of infra protection and infra workers vacancies was noted for the Perway Department.	Human Factors
			Inspections conducted by Track Inspectors were not signed by the Maintenance Manager or Depot Engineer, which left gaps of whether the depot management is aware of the turnout conditions in their responsible sections.	Non-adherence to SOP
			There was Mud pumping was observed at the vicinity of the derailment area and there was evidence of a drainage problem in the cutting.	Poor maintenance
			Non-adherence to Footplate Inspections by Perway Department.	Non-adherence to SOP
			There is a high rate of RRV failures, which affect Perway Maintenance. With the shortage of infra protection and the failure rate of RRV, the perway track maintenance is compromised.	Poor maintenance

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Forfar-rayton derailment	On 23 of March 2018, TFR Train 8000 consisting of four 18E locomotives derailed at the level crossing between Forfar and Rayton stations. Train 8000 departed Witbank yard at approximately 17h05 and was destined for Pyramid South. It derailed at approximately 18h34.	<p>No properly designed drainage system at the Forfar-Rayton level crossing.</p> <p>The safety alert notice issued by TFR corporate safety office was not complied with by neither the Operations nor the infrastructure departments at the Witbank Depot.</p> <p>The train driver signed for the safety notice about heavy rain, but failed to comply with its contents, i.e. speed restriction of 30 km/h</p> <p>The train driver was commanded to test run the central line with Train 9632 without being certified competent to test run the line.</p>	<p>Poor design</p> <p>Non-adherence to SOP</p> <p>Negligence</p> <p>Negligence</p>
PRASA	Netreg and heideveld stations derailment	On 18 January 2018 at approximately 04h35 PRASA Train 9632 derailed over facing points No.2005 between Heideveld and Netreg stations. The train set configuration comprised of 3 x motor coaches and 5 x plain trailers of 5M2s.	<p>Leading motor coach No. 17501 derailed over points No.2005 that were unclamped due to sub-standard maintenance.</p> <p>The wheels reading taken from the derailed motor coach on the last shedding on axles 1, 2 and 4 had high flanges.</p> <p>There was no evidence that the line was declared safe for passage of trains.</p> <p>The motor vehicle driver involved in the occurrence did not obey the stop sign at the level crossing. This resulted in the collision.</p>	<p>Poor maintenance</p> <p>Poor maintenance</p> <p>Non-adherence to SOP</p> <p>Negligence</p>

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Abbotsdale level crossing	On 05 July 2018 at approximately 11h10, a TFR Train 1205 which consisted of three locomotives and hauling 32 empty wagons was travelling from Malmesbury to Darling when it collided with a private motor vehicle at Abbotsdale level crossing in the Western Cape. There were two occupants in the vehicle. The motor vehicle driver was seriously injured, and the passenger passed away.	Some of the road markings are starting faded.  There is vegetation around the level crossing.	Poor maintenance  Poor maintenance
TFR	Kameel – madibogo level crossing	On 2 June 2018 at approximately 16h05, Train 2159 en route from Vryburg to Mafikeng collided with a private vehicle at the level crossing between Madibogo and Kameel.	The warning boards W318 (advance warning boards) were missing on both sides of the road.  The driver of the motor vehicle failed to stop at the stop sign and observe both side before entering the level crossing.  OBC was dysfunctional on the day of incident.  Train drivers changed trains while other wagons of Train 1282 were still occupying the level crossing.	Inadequate signage  Negligence  Poor maintenance  Negligence
TFR	Mamreweg level crossing	On 12 August 2018 at approximately 22h28, TFR train 1282 was travelling from Salko en route to De-hoek when a motor vehicle collided with it at Mamreweg level crossing. This was an empty train comprising of two diesel locomotives and 24 wagons.	There is not enough lighting installed at the level crossing to assist motorists with clear visibility.  A motor vehicle collided with Train 1282 at Mamreweg level crossing.  Yard official authorised the train without ensuring the points were correctly set.	Inadequate lighting    Non-adherence to SOP

Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Npc intercement derailment	On 17 August 2018 at approximately 22h35, train 4292 en route from control cabin 235 to Mount Vernon derailed at NPC Intercement yard. The TFR train consisted of one 18E locomotive hauling 10 loaded wagons containing clinker. The third wagon derailed with two set of wheels, while the fourth wagon derailed with four set of wheels over the facing points turnout No. 7 after being authorised by the TCO.	No drug test was conducted after the incident. This is in contravention with the SANS 3000-4: 6.9.5.3.	Human Factors
			There was no device installed on the train to give an objective measure of speed. As such, the speed of the train at the time of the incident could not be determined as it was not documented by either TFR nor NPC Intercement.	Risk Assessment
			Fitness for duty of safety critical personnel is not managed effectively. NPC Intercement does not have a process for declaring fitness for duty before the commencement of duty as stipulated in the SANS 3000-4: 6.4.1.4 and 6.4.3.2.	Human Factors
			The train crew was required to continue with their journey after the accident. They were not relieved of their duties after the incident pending the investigation. It was noted that the Yard Master was not aware of the removal procedure for managing safety personnel post incidents.	Human Factors
			There was no evidence that the risk assessment was conducted after the incident. The operator did not provide any evidence as requested by the RSR Inspector.	Non-adherence to SOP



Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
SIBANYE STILLWATER	Sibanye stillwater rustenburg psbt	A Persons Struck by Train incident occurred on 18 July 2018 at approximately 20h40 in Rustenburg at the Sibanye Stillwater Mine. The Train Assistant of train 3001 was fatally injured when she fell during a shunting movement at Klipfontein loop.	Insufficient supervision displayed on the working of the train crew during shunting movements. This indicates minimal recognition of a safety culture and non-compliance to Train Working Rules.	Poor supervision
			The train crew was permitted to work with unsafe equipment (locomotive with a missing step) for a prolonged period with no urgent intervention from management.	Negligence
			The train crew was exposed to working in an unsafe working environment and conditions. The Klipfontein Loop was insufficiently illuminated considering that shunting operations take place at night.	Poor lighting
			Activities observed during task observations and refresher training appears to exclude critical tasks of shunting duties. The task observation also takes place fewer frequent.	Poor supervision



Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Flonker station collision	On 10 August 2018, the train driver and Train Assistant signed on duty at 08h00 at the De Aar depot. They were scheduled to work a train to Beaufort West; however, the train was already four hours late. The train crew was then instructed to work another train. Train 9901 with seven light 34 - class diesel locomotives to Rossmead.	The train driver struggled to handle her train when it ran away. She pressed the Stop button that switched off her train while it was running away on a down gradient and collided with a stationery motorcar Train 8928 at Flonker station.	Train handling
			The train driver was not aware that her train had lost air and the affect it would have on the overall braking system of her train will be affected. It was discovered that due to the leakage of the main air from the main reservoir, the train air brakes were depleted when she wanted to use the Emergency brake application valve and there was no air/vacuum.	Rolling stock
			The train driver did not perform proper inspection on her train before departure. As a result she did not realise that the locomotives cut out cocks was in the open position instead of in the closed position as stipulated for multiple locomotive working in the Diesel Electric Locomotives manual.	Non-adherence to SOP



Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Wonderkop train collision	On 02 August 2018 at approximately 02h43, TFR Train 5460 travelling with three light locomotives collided with the staged wagons of Train 2611 that were left unprotected at Wonderkop station mainline. The train was coming from Danskraal en route to Kroonstad and train 2611 that was coming from Kroonstad en route to Danskraal. The point of collision was established to be at kilometre 27 at mast-pole 5.	The TCO was working without supervision. There is no coordinator at Kroonstad CTC. The Section Manager was not deployed at the CTC on the day of the occurrence. More often when section managers are deployed at the CTC, they end up assisting outside due to the shortage of train drivers and section managers. The supervision at the CTC is compromised which compromises the safe running of trains.	Poor supervision
			The load that was left behind at Wonderkop main line was not protected by either the train driver or TCO due to miscommunication between the driver and the TCO.	Poor communication
			It was noted that the driver and the TCO were both not sure on what to do next when the leading locomotive of Train 2611 failed. As a result, they were phoned the section manager and yard planners to assist with the way forward. This resulted in the proper channel of communication between the driver and the TCO being broken.	Poor communication
			Shortage of track maintenance vehicles to deal with identified faults on the track.	Inadequate equipment



Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Halfweg/ loop 10 – dagad/ loop 11 derailment	On 11 August 2018 at approximately 10h10, an empty TFR Train No. 1050 from Halfweg/ Loop 10 en route to Sishen derailed due to a broken rail near kilometre point 473. The train consisted of six locomotives and 342 empty wagons.	The trolley did not run on the day of the occurrence due to a break down.	Inadequate equipment
			The Ultrasonic Broken Rail Detector (UBRD) was not working on the day of the occurrence.	Inadequate equipment
			There are speed restrictions on the line indicating that the track is in a sub-standard condition.	Inadequate signage
			No supervision for the abnormal working due to the shortage of Section Managers.	Poor supervision
PRASA	Robinson derailment	On 21 September 2018 at approximately 08h49, PRASA train no 0223 derailed over a set of points in the section between Robinson and Homelake. The train was coming from Randfontein en-route to Johannesburg.	After running through the set of points, the train driver and TCO initiated the reverse movement that led to the derailment.	Negligence
			The fitness for duty of the TCOs was not verified at sign on by the Section Manager. The procedure to ensure that the TCOs were fit for duty was not followed.	Human Factors
			The train driver's medical certificate was recorded for 06/03/2017 per referral letter. However, there was no medical certificate issued following the referral letter issued on 30/08/2017. The only medical certificate that was issued was after the occurrence dated 25/09/2018.	Human Factors
			The points were half cocked due to the foreign object between the blade and stock rail.	Poor maintenance





Operator	Investigation name	Short description	Some of the findings of each occurrence	Categories
TFR	Teza derailment	On 24 September 2018 at approximately 20h30, Train 9468 en route from Golela to Richards Bay derailed with 11 wagons. The train was loaded with rock phosphate when it derailed in the section between Richards Bay and Golela at kilometre 27/500.	The train crew did not protect the train after the incident because they did not have the necessary tools to do so i.e. torch and detonators. The detonators are expired for more than two years.	Non-adherence to SOP
			No measurements of the wheels were taken onsite after the derailment and when the wheels were removed from the incident site.	Non-adherence to SOP
TFR	Brits level crossing	On the 19 June 2018, TFR Train 8423 consisting of four 22E locomotives and 74 fully loaded wagons collided with a truck at the Brits level crossing. Train 8423 had earlier departed Marikana and was destined for Pyramid South.	The truck driver failed to obey the road signs and exposed himself and his passenger to the danger of an on-coming train.	Negligence
			There is inadequate/no traffic law enforcement at the level crossings.	Lack enforcement
			All the road markings at the level crossing have faded.	Poor maintenance
			The rumble strips on all the roads leading to the crossing are run-down	Poor maintenance
			The speed humps from both sides of the crossing are too close to the stop sign	Non-adherence to SOP
			There was overgrown vegetation along the level crossing.	Poor maintenance
PRASA	Ridge mor villa level crossing	On 17 December 2018 at approximately 08h03 PRASA train 3202 collided with a private motor vehicle at Ridge Mor Villa level crossing.	Faded road markings at the level crossing.	Poor maintenance
			There are no records indicating that a level crossing awareness and risk assessment was conducted at the level crossing.	Non-adherence to SOP



## Safety assessments and approvals of new works and technology development

During the 2018/19 reporting year, the RSR undertook numerous safety reviews of railway new works and new technology developments. The intent of these reviews is to ensure compliance with the requirements of applicable legislation and standards, to promote the principles of systemic engineering, identify safety risks associated with the projects and to ensure that safety levels are improved through mitigation of known risks. The extent of the submitted projects ranged from minor modifications of rolling stock and infrastructure to major new works, signalling and rolling stock projects. These projects were submitted to fulfil permit holder's obligations to notify the Regulator of changes to the SMS and were received from state-owned rail and private sectors companies. The operators included, among others, Sasol, Impala Platinum, Exxaro, Transnet, Eskom, PRASA, AfriSam Roodepoort, SAPPI SAICCOR, Newlyn Investment (Pty) Ltd, PPC Cement and Molamu Majories and Tharie Joint Venture (PTY) LTD (MMTR).

During the latter part of the year, the RSR saw a substantial increase in the number of projects submitted for review. This increase coincidentally followed the withdrawal of the New Works Gazette by the Department of Transport on 15 September 2018. During the month of October alone, the RSR received nine notifications of new projects and approved and issued 15 infrastructure and rolling projects, an increase in comparison with an average of fewer than 10 projects reviewed and issued per month.

To further illustrate the increase in project submissions, during the month of November, the RSR completed the review of 16 projects from Transnet, Eskom, PRASA and the private sector of which six were at notification or concept stage and 10 were at design stage. Of these projects, 11 were infrastructure related and five rolling stock related projects. During the same month, the RSR received documentation for 11 projects which includes documentation for new and ongoing projects.

To highlight the type of infrastructure projects that were submitted, reviewed and issued, the following sample of projects are provided for illustrative purposes:

- i. Transnet National Ports Authority (TNPA) plans to design and construct of an additional rail facility for the duine area in the port of Richards Bay.
- ii. Waterberg expansion project: Construction of a new Marakele loop 3.3 km along the railway line between Thabazimbi and Lephalale as well as the construction of a new Diepspruit loop 3.2km along the railway between Matlabas and Lephalale.
- iii. Transnet Engineering: Long Term Deployment Plan Projects: Expansion of Existing Depots: Insezi Locomotives Depot in Richards Bay.
- iv. PRASA Western Cape Resignalling Phase 3.2 project, part of the WC electronic interlocking Resignalling project.

The following are some of the rolling stock related reviews that were issued to the operators during the quarter:

- i. Transnet Engineering submission for the design and development of a CR20 wagon.
- ii. Testing of 375 CR17 wagons radio distributed power (RDP) trains between Erts and Salkor for TFR. The submission covered the request for approval for testing of the trains in loaded condition from the mines to offloading site.
- iii. PRASA submission for hauling of the new electrical multiple units passenger train (EMU1) from the Dunnottar Gibela factory to the Wolmerton depot. A diesel locomotive hauled the EMU from Dunnottar to Springs (section not electrified) station from where the EMU was powered by 3kV DC to Wolmerton.
- iv. Molamu Majories and Tharie Joint Venture (PTY) LTD (MMTR): MMTR was issued with a 3-month test and commissioning permit to afford the JV enough time to apply for a full permit.
- v. The haulage of the two PRASA EMUs from Wolmerton to Cape Town. This is part of the plan to introduce new trains in different provinces to improve safety in rail.

At part of the ongoing review of the PRASA GSM-R project, the RSR attended the testing of the GSM-R network utilising handsets for communicating between the Gauteng Nerve Centre (GNC) and the technicians on board the train which took place on 3 December 2018, a round trip from Park station to Pretoria station.

In keeping with the mandate to review of significant new works introduced in rail, the RSR also conducted an inspection of the Park station and Braamfontein section for the critical Gauteng Re-signalling project following the test and commissioning of the Johannesburg Complex from the 16 November 2018 to 8 December 2018.

While PRASA was facing challenges relating to manual train authorisations (MTAs), theft, vandalism and the attendant risk to safe railway operations, the re-signalling programme continued with the test and commissioning of the electronic interlocking signalling systems in various areas. This resulted in a significant reduction of MTAs in the Western Cape.



# APPENDIX – A : OCCURRENCE AND INCIDENT REPORTING CATEGORIES

## Operational Occurrence Categories

Category	Description
<b>A</b>	<b>Collisions During Movement Of Rolling Stock</b>
A-a	Collision between rolling stock on a running line
A-b	Collision of rolling stock with an obstruction on a running line (including road vehicles colliding with rolling stock)
A-c	Collision with a stop block on a running line
A-d	Collision of rolling stock other than on a running line
A-e	Collision of rolling stock with an obstruction other than on a running line
A-f	Collision with a stop block (other than on a running line)
<b>B</b>	<b>Derailments During Movement Of Rolling Stock</b>
B-a	Derailment of rolling stock on a running line
B-b	Derailment of rolling stock on a line other than a running line
B-c	Derailment during tippler activities
<b>C</b>	<b>Unauthorized Movements (Rolling Stock Movement Exceeding The Limit Of Authority)</b>
C-a	Signal passed at danger (SPAD) on a running line
C-b	Signal passed at danger (SPAD) on any other line
C-c	Physical token passed on a running line
C-d	Physical token passed on any other line
C-e	Verbal authority exceeded on a running line
C-f	Verbal authority exceeded on any other line
C-g	Written authority exceeded on a running line
C-h	Written authority exceeded on any other line
<b>D</b>	<b>Level Crossing Occurrences</b>
D-a	Collision between rolling stock and a road vehicle(s) (including motor vehicles, bicycle or animal-drawn vehicles) at a recognized level crossing on a running line
D-b	Collision between rolling stock and a road vehicle(s) (including motor-powered, bicycle or animal-drawn vehicles) on any line other than a running line (including yards, sidings and private sidings) at a recognized level crossing
D-c	A person(s) struck by rolling stock at a recognized pedestrian level crossing
D-d	A person(s) struck by rolling stock at a recognized road level crossing

Category	Description
<b>E</b>	<b>Persons Struck During Movement Of Rolling Stock (Other Than At Level Crossings)</b>
<b>E-a</b>	Occurrence where a member of the public is struck by rolling stock on a running line
<b>E-b</b>	Occurrence where an employee is struck by rolling stock on a running line
<b>E-c</b>	Occurrence where a contractor or contractor's employee is struck by rolling stock on a running line
<b>E-d</b>	Occurrence where a member of the public struck by rolling stock on a line other than a running line
<b>E-e</b>	Occurrence where an employee is struck by rolling stock on a line other than a running line
<b>E-f</b>	Occurrence where a contractor or contractor's employee is struck by rolling stock on a line other than a running line
<b>F</b>	<b>People Related Occurrences: Trains Outside Station Platform Areas (In Section)</b>
<b>F-a</b>	Occurrence where a person fell or was pushed from inside a moving or stationary train
<b>F-b</b>	Occurrence where an employee fell or was pushed from inside a moving or stationary train
<b>F-c</b>	Occurrence where a contractor or contractor's employee fell or was pushed from inside a moving or stationary train
<b>G</b>	<b>Passenger Related Occurrences: Travelling Outside Designated Passenger Area</b>
<b>G-a</b>	Category G occurrences covers the number of occurrences as a result of passengers travelling outside the designated passenger area of the train
<b>H</b>	<b>People Related Occurrences: Platform-Train Interchange</b>
<b>H-a</b>	Occurrence where a passenger fell between the train and the platform whilst entraining/detraining a stationary or moving train
<b>H-b</b>	Occurrence where a passenger fell on the platform whilst entraining/detraining a stationary or moving train
<b>H-c</b>	Occurrence where an employee fell between the train and the platform whilst entraining/detraining a stationary or moving train
<b>H-d</b>	Occurrence where an employee fell on the platform whilst entraining/detraining a stationary or moving train
<b>H-e</b>	Occurrence where a contractor or contractor's employee fell between the train and the platform whilst detraining a stationary or moving train
<b>H-f</b>	Occurrence where a contractor or contractor's employee fell on the platform whilst entraining/detraining a stationary or moving train
<b>I</b>	<b>People Related Occurrences: Station Infrastructure</b>
<b>I-a</b>	Occurrence resulting in injuries and fatalities to public due to infrastructure defects in a public area of the station
<b>I-b</b>	Occurrence resulting in injuries and fatalities to passengers due to infrastructure defects in a passenger area of the station

Category	Description
I-c	Occurrence resulting in injuries and fatalities to an employee due to infrastructure defects in a public area of the station
I-d	Occurrence resulting in injuries and fatalities to an employee due to infrastructure defects in a passenger area of the station
I-e	Occurrence resulting in injuries and fatalities to a contractor or contractor's employee due to infrastructure defects in a public area of the station
I-f	Occurrence resulting in injuries and fatalities to a contractor or contractor's employee due to infrastructure defects in a passenger area of the station
<b>J</b>	<b>Electric Shock Of People Occurrences</b>
J-a	Electrical shock to a member of the public on the network infrastructure
J-b	Electrical shock to an employee on the network infrastructure
J-c	Electrical shock to a contractor or contractor's employee on the network infrastructure
J-d	Electrical shock to the member of the public including passengers whilst on or in rolling stock
J-e	Electrical shock to an employee whilst positioned on or part of rolling stock
J-f	Electrical shock to a contractor or contractor's employee whilst positioned on or part of rolling stock
J-g	Electrical shock to the member of the public in the public area of a station
J-h	Electrical shock to an employee in the public area of a station
J-i	Electrical shock of a contractor or contractor's employee in the public area of a station
J-j	Electrical shock to the member of the public in the passenger area of a station
J-k	Electrical shock to an employee in the passenger area of a station
J-l	Electrical shock of a contractor or contractor's employee in the passenger area of a station
<b>K</b>	<b>Spillage/Leakage, Explosion Or Loss Of Dangerous Goods</b>
K-a	Spillage or leakage of dangerous goods en route
K-b	Spillage or leakage of dangerous goods during shunting operations
K-c	Spillage or leakage of dangerous goods whilst staged
K-d	Missing consignment of dangerous goods
K-e	Theft of dangerous goods
K-f	Explosion of dangerous goods
<b>L</b>	<b>Fire Occurrences</b>
L-a	Fires on a fixed operational asset
L-b	Fire of freight
L-c	Fire of rolling stock
L-d	Veld fires that threaten operational safety

## Security Related Incident Categories

Category	Description
<b>1</b>	<b>Theft Of Assets Impacting On Operational Safety</b>
1-a	Theft of rolling stock components in section
1-b	Theft of rolling stock components in yards (staged)
1-c	Theft of civil infrastructure components in section
1-d	Theft of civil infrastructure components in yards and sidings
1-e	Theft of overhead traction equipment in section
1-f	Theft of overhead traction equipment in yards and sidings
1-g	Theft of train control equipment (signalling) in section
1-h	Theft of train control equipment (signalling) in yards and sidings
1-i	Theft of ancillary equipment including public address systems, information boards, CCTV
<b>2</b>	<b>Malicious Damage (Vandalism) To Property Impacting On Operational Safety</b>
2-a	Malicious damage (vandalism) of rolling stock components in section
2-b	Malicious damage (vandalism) of rolling stock components in yards and sidings (staged)
2-c	Malicious damage (vandalism) of civil infrastructure components in section
2-d	Malicious damage (vandalism) of civil infrastructure components in yards and sidings
2-e	Malicious damage (vandalism) of overhead traction equipment in section
2-f	Malicious damage (vandalism) of overhead traction equipment in yards and sidings
2-g	Malicious damage (vandalism) of train control equipment (signalling) in section
2-h	Malicious damage (vandalism) of train control equipment (signalling) in yards and sidings
2-i	Malicious damage (vandalism) of ancillary equipment including public address systems, information boards, CCTV
<b>3</b>	<b>Threats Of Operational Safety</b>
3-a	A bomb threat to network
3-b	A bomb threat to station
3-c	A bomb threat to rolling stock
3-d	Threats due to electrical power outages
3-e	Threats other than bomb and power outage threats
<b>4</b>	<b>Train Kidnapping Or Hijacking</b>
4-a	Kidnapping or hijacking of passenger trains
4-b	Kidnapping or hijacking of freight trains
4-c	Kidnapping or hijacking of other rolling stock

Category	Description
<b>5</b>	<b>Crowd-Related Occurrences</b>
5-a	Crowd related occurrence and includes stampede action
<b>6</b>	<b>Industrial Action</b>
6-a	Industrial action that causes a threat to security or safe railway operations or to security
<b>7</b>	<b>Personal Safety On Trains</b>
7-a	Murder
7-b	Attempted murder
7-c	Rape
7-d	Assault
7-e	Indecent Assault
7-f	Aggravated robbery
7-g	Common robbery
7-h	Theft
7-i	Bomb explosion
<b>8</b>	<b>Personal Safety On Stations</b>
8-a	Murder
8-b	Attempted murder
8-c	Rape
8-d	Assault
8-e	Indecent Assault
8-f	Aggravated robbery
8-g	Common robbery
8-h	Theft
8-i	Bomb explosion
<b>Category 9</b>	<b>Personal Safety Outside Station Platform Area (In Section Between Stations, Including Yards, Sidings And Depots)</b>
9-a	Murder
9-b	Attempted murder
9-c	Rape
9-d	Assault
9-e	Indecent Assault
9-f	Aggravated robbery
9-g	Common robbery
9-h	Theft
9-i	Bomb explosion











**HEAD OFFICE (CENTURION):**

+27 12 848 3000, Lake Buena Vista Building,  
No.1 Gordon Hood Avenue, Centurion, 0157, SOUTH AFRICA

**JOHANNESBURG:**

+27 12 848 4000, 2nd Floor, Metropolitan Building,  
Block A, No.8 Hillside Road, Parktown, Johannesburg, 2196, SOUTH AFRICA

**CAPE TOWN:**

+27 87 806 5180, 20th Floor, 9 Riebeeck Street (Lower Burg Street)  
Atterbury House, Cape Town, 8000, SOUTH AFRICA

**DURBAN:**

+27 87 806 5219, Office 101A, 1st Floor, Ridgeview Umhlanga Building,  
No.1 Nokwe Avenue, Ridgeside, Umhlanga Ridge, Durban, SOUTH AFRICA

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