DEPARTMENT OF TRANSPORT

NOTICE 1688 OF 2023

NEW SAFETY PERMIT FEE MODEL

The Department of Transport together with the Railway Safety Regulator (RSR) developed a new safety permit fee model (the model) to calculate the annual safety permit fees to be charged to rail operators in South Africa by the RSR.

The RSR has a legislated mandate to oversee the safety performance by all railway operators in South Africa, including those of neighbouring states whose rail operations enter South Africa. As such, the RSR maintains a leading role in facilitating safe railway operations and is legally established as the instrument through which the objects of its enacting legislation are achieved.

In terms of section 23 (2) (a) of the National Railway Safety Regulator Act, 2002 (Act No. 16 of 2002), the Minister must annually determine fees that the RSR must charge for safety permits, including a non-refundable application fee which shall be published in the Gazette.

Interested persons are invited to submit comments on the developed model to the Director-General, Department of Transport for the attention of Ms Moloko Machaka within 60 days after publication of this notice:

The Department of Transport

Private Bag X193

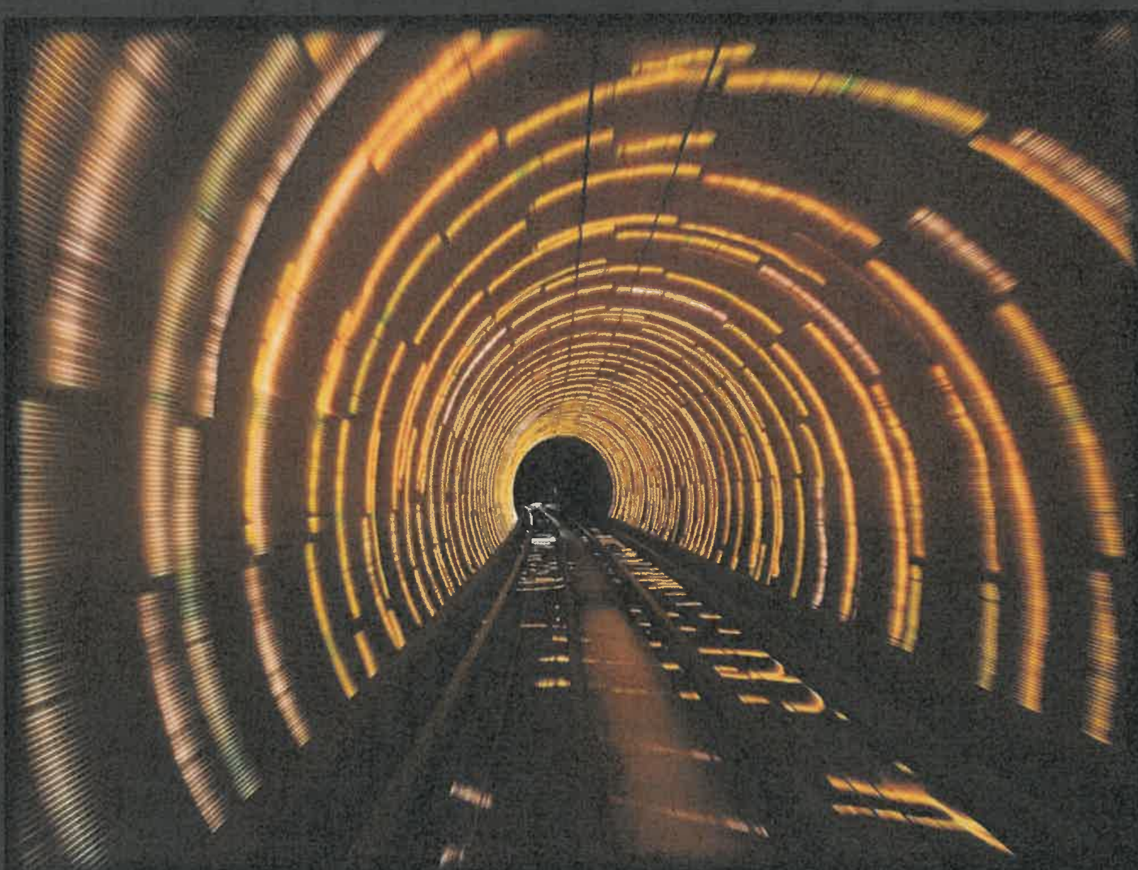
PRETORIA

0001

E-mail: machakam@dot.gov.za

transport
Department:
Transport
REPUBLIC OF SOUTH AFRICA

RSR RAILWAY SAFETY REGULATOR
RAIL SAFETY ON THE RIGHT TRACK



DRAFT Model-Build Report

Railway Safety Regulator

Development of a Safety Permit Fee Model

01 April 2022

List of Abbreviations

ACSA	Airports Company South Africa
ASIP	Annual Safety Improvement Plan
ATNS	Air Traffic and Navigation Services
CAGR	Compound Annual Growth Rate
CBRTA	Cross-Border Road Transport Agency
DEL	Department of Employment and Labour
DoT	Department of Transport
GDP	Gross Domestic Product
NIMS	National Railway Safety Information and Monitoring System
NRSR	National Railway Safety Regulator
PFMA	Public Finance Management Act
PRASA	Passenger Rail Agency of South Africa
RAF	Road Accident Fund
RSR	Railway Safety Regulator
RTIA	Road Traffic Infringement Agency
RTMC	Road Traffic Management Corporation
SACAA	South African Civil Aviation Authority
SADC	Southern African Development Community
SAMSA	South African Maritime Safety Authority
SANRAL	South African National Roads Agency SOC Ltd
SAPS	South African Police Services
SMS	Safety Management System
SMSR	Safety Management System Report
TFR	Transnet Freight Rail

Executive Summary

This Model-Build Report provides a detailed account of the mechanisms and logic underlying the New Safety Permit Fee Model. High-level findings from preceding research and stakeholder engagements are also included in the report to illustrate the processes followed before model construction was undertaken and how the associated learnings informed the various elements of the final model.

The New Safety Permit Fee Model has been developed to calculate the annual safety permit fees to be charged to rail operators in South Africa by the Railway Safety Regulator (RSR). The RSR has a legislated mandate to oversee the safety performance by all railway operators in South Africa, including those of neighbouring states whose rail operations enter South Africa. As such, the RSR maintains a leading role in facilitating safe railway operations and is legally established as the instrument through which the objects of its enacting legislation are achieved.

Prior to the construction of the New Safety Permit Fee Model, a market review was performed to understand the South African rail landscape as well as international rail safety conventions and operating environments. This research was supported by a desktop study on the main revenue and expense drivers of the RSR and activity trends in the South African rail industry which may impact these. The key findings from these exercises have been included in this report for reference. Analyses were performed on the merits and weaknesses of the both the previous model used to calculate safety permit fees and the model proposed by the RSR in 2019. Reports were issued on the findings of these exercises. Key outcomes were subsequently used to inform the construction of the new model, ensuring that previous pain-points had been addressed.

On conclusion of relevant research and model analysis, the railway operators were engaged through an online survey to better understand their perspectives on the safety permit fee calculation. Operator responses were consolidated and analysed, with an additional report on the findings being issued. The draft model was then demonstrated to railway operators in four in-person and virtual sessions in three cities within South Africa. This exercise was intended to allow operators to share their initial thoughts on the calculation and newly developed model.

This report ties together the outcomes of the preceding phases with a detailed breakdown of the New Safety Permit Fee Model and its underlying calculation mechanisms and principles. Findings from additional research on global passenger and freight rail trends are shared in this report, as well as related commentary on the financial sustainability of the RSR given the implications of the above findings. It is noted that cost-recovery principle which underpins the calculation of the New Safety Permit Fee Model ensures that the RSR is able to meet its financial needs to the extent that the cost burden placed on rail operators is not unsustainable. The importance of cost-containment by the RSR and a healthy rail industry are emphasised in terms of ensuring financial sustainability both operators and the regulator, given the latter's dependence on the revenue from safety permit fees. Recommended model parameters are provided based on the evaluation of a scenario analysis output which is also shared in the report. It is important to note that focus should not be placed on the actual fee output as this is dependent on finalisation of the activity data. The scenario analysis section of this report is intended to provide insights into the impact of changing each model parameter on the fee results.

Given the energy-efficiency and cost-competitiveness of rail, the impending introduction of third-party usage of the national railway network and the buoyant local mining industry which was spurred by strong commodity prices in 2021, rail adoption in South Africa could be expected to increase in years to come. The extent of this adoption will depend on the reliability of rail operations and mismanagement thereof which were identified as major obstacles within the South African context. It is of utmost importance that the costs to be recovered are appropriate and affordably recoverable from the operators. This ensures the financial viability of both operators and of rail as a mode of transport, which in turn strengthens the financial sustainability of the RSR itself.

Background

In terms of Section 23(2a) of the National Railway Safety Regulator Act, Act 16 of 2002 (as amended, and hereafter referred to as the NRSR Act), "the Minister must annually determine fees that the Regulator must charge for safety permits, including a non-refundable application fee which shall be published in the Gazette".

In the 2012/13 financial year (FY), the Railway Safety Regulator (RSR) reviewed the structure and processing mechanisms of the safety permit fee model system, with the view of deriving a more sustainable model premised on sound scientific principles that would be acceptable to the RSR's key stakeholders (the operators). Multiple model options were developed and 80% of operators selected the Mixed Model, which is a mixture of the Revenue based, Activity and Rate-adjusted based model.

The Mixed model selected by operators was supported by the RSR and its Board of directors as it takes the safety risk exposures into account both from the perspective of the size of the operators (i.e., revenue generated by operators is proportional to their level of activity) as well as activities that contribute to operational safety risks.

The revised permit fee model, which was implemented in 2014/15 FY enabled the generation of sufficient revenue required for the RSR to fully implement its mandate within the Republic of South Africa and to simultaneously position itself as a key role-player in the harmonisation of railways in Southern African Development Community (SADC) region.

The Mixed model was valid for 5 years (2014/15 FY – 2018/19 FY) after which time the model would be reviewed and modified where necessary to keep up with the agile economy and rapid changes in the rail operation environment.

The railway industry was consulted by the RSR during the past two financial years (2018/19 FY and 2019/20 FY) to obtain their views on a model that would be sustainable, effective ad cost-efficient to both parties. The parties resolved that the desired outcome of this permit fee model review is to:

1. Ensure the financial sustainability of the RSR through the affordable permit fees; and
2. Develop a model that will ensure transparency, affordability and be premised on scientific principles that are easy to understand.

The principles set out below, as agreed upon by the industry, formed the guideline in the review and development of the safety fee permit model.

1. Affordability and Economic neutrality
2. Equitability and Fairness
3. Predictability and Transparency
4. Rationality
5. Flexibility
6. Openness and trust

Project Objectives and Scope

The RSR required the development of a safety permit fee model, for implementation in 2023 (FY24), that is relevant in a dynamic industry which faces new and varying challenges as well as a high potential for growth. There is opportunity for rail transport to increase its role as an integral part of the economy through public and freight transport, but this requires support from an appropriate and sustainable safety permit fee model. As a result, some of the key objectives that were targeted through this project included:

- Development of a robust, sustainable and logical permit fee model that is premised on scientific principles that are understandable and fair to both the RSR and the railway operators;
- A model which is able to produce a permit fee that makes financial sense to both the RSR and the rail operators;
- A model which is capable of considering multiple inputs and scenarios to assist with scenario/sensitivity testing; and
- Stakeholder engagement and the incorporation of relevant stakeholder feedback in the construction of the model; and
- Using best practice to inform the approach and construction of the model.

Market Analysis & Benchmarking

Review of 2014/15 Safety Permit Fee Model

The prior Safety Permit Fee Model implemented by RSR sought to address the complaints received from railway operators while enabling the sufficient generation of revenue required for the RSR to fully implement its mandate within South African and simultaneously positioning itself as a key role-player in the harmonisation of railways in the SADC region.

Through a process of benchmarking and stakeholder engagement, the model determined was the Mixed Revenue and Activity & Rate-Adjusted Permit Fee model. The Revenue-based component of the model was applied to the operators with rail as a core activity, while the Activity & Rate-Adjusted Permit Fee model was applied to operators which did not have rail as a core activity.

As such, it was thought to take safety risk exposures into account both from the perspective of the size of the operators (i.e., revenue generated by operators was thought to be proportional to their level of activity) as well as activities that contribute to operational safety risks.

While the implemented model may have rectified certain weaknesses that were identified before, the model did not appropriately account for the risk profiles of differing operators and their risk contribution to the rail network as a result of the use of revenue as a proxy for risk and the use of limited information in the determination and analysis of risk factors. Further, the fee structure and methodology do not incentivise the improvement of safety by operators due to the model's inability to sufficiently determine the risk profile of individual operators.

The model additionally fails to fulfil the requirements of Equitability and Fairness, Predictability and Transparency, Rationality, Flexibility and Openness and trust as desired by stakeholders in the development of the Safety Permit Fee Model to be implemented.

Market and Trend Analysis of the South African Railway Industry

Within South Africa, the railway industry is dominated by three operators, namely the Passenger Rail Agency of South Africa (PRASA), Transnet Freight Rail (TFR) and Bombela Concession Company (Gautrain). These operators are responsible for approximately 80% of the permit fee revenue earned by the RSR.

PRASA is a state-owned enterprise responsible for most passenger rail services in the country. In the previous decade, it has experienced declining volumes of both passenger kilometres and train kilometres, with passenger kilometres falling at a greater rate than train kilometres. This indicates both declining ridership, as well as a decreased level of services offered by PRASA.

TFR is the largest operating division of Transnet. The division's primary business is to provide rail transport of commodities for export, regional and domestic markets. TFR has experienced steady volumes in the latter part of the previous decade following growth in the early part of the decade when measured with regards to tonne kilometres. However, there has been a decline in train kilometres in the latter part of the previous decade. This indicates a lower level of activity by TFR on the rail network while increasing the volume moved per activity.

Gautrain is a commuter rail system in Gauteng. Gautrain experienced strong volume growth in the early parts of the decade follow the commencement of the service. In the latter part of the decade, the volumes of both passenger kilometres and train kilometres decreased slightly compared to previous periods.

In terms of the NRSR 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 SAPS and the Department of Employment and Labour (DEL) that share concurrent jurisdiction and mutual interests in addressing railway safety.

Operational occurrences have remained approximately level over the previous decade with a slight decrease in the frequency of occurrences per annum towards the present. Conversely, security related incidents decreased in the earlier part of the decade, before growing sharply at a rate of 13.5% Compound Annual Growth Rate (CAGR) between its lowest point in 2012/2013 to 2019/2020.

Economic and social challenges affect all operators within the rail industry, with economic conditions constraining the demand for services. Furthermore, periods of poor economic conditions result in increases in security incidents which further negatively impact operators, with increases in vandalism, theft and other security incidents.

Fitch forecasts South African GDP to have grown 3.6% in 2021 after a decline of 8.1% in 2020 which may result in increased demand relative to 2020. However, this demand is likely to impacted by several factors including commodity demand, operational performance and broader economic recovery within South Africa.

In addition, passenger rail may be further constrained by concerns regarding safety as well as changing commuters' preferences, with greater availability and affordability of alternatives such as ride-hailing services or ridesharing.

International Rail Safety and Benchmarking

In determining which countries to assess and benchmark against the South African railway safety regulatory regime, consideration was given to the appropriateness of the foreign systems within the South African railway operating context, as well as the availability of information on the regulatory system being investigated. This report considers a range of countries, some with extensive and well-established regulatory and railway systems and others which are still undergoing expansion, reform and development.

Our analysis was based on the safety regulators in:

- Canada
- New Zealand
- United Kingdom (UK)
- Brazil
- India

China was not considered because of the monopolistic structure of its railway industry in which there is a single dominant state-owned railway and consequently a legislative framework on railway safety which is not comparable to the multi-player industry in South Africa, which includes private operators. The German railway system was considered but ultimately not selected for benchmarking as the national railway regulator has oversight of only two-thirds of rail participants, with the remainder being under the separate jurisdiction of the federal states within the country. The system was considered not to be amenable to effective benchmarking against the South African regulatory regime.

South Africa's Railway Safety Regulator was benchmarked against selected international regulatory regimes in accordance with:

1. Legislation
2. Regulator Mandate
3. Operating Requirement
4. Safety Permit Fee Calculation

The review of the railway safety regulatory regimes of the selected countries revealed the idiosyncrasies that exist in each unique operating environment. All countries considered have the same overriding objective to make the railway operating environment safer for the benefit of both industry participants and for society as a whole. The means through which this is achieved and the responsibilities placed on each regulator differed across jurisdictions. India and the UK both had dedicated regulatory bodies with a defined focus on rail safety similar to South Africa, while Canada, New Zealand and Brazil perform railway safety regulation through their respective departments of transport, or extensions of these.

In most regulatory systems, the primary responsibility of safety was placed on operators, while the regulators assumed a supervisory and enforcement role. The graduated-enforcement concept implemented by Canada provided insight into possible remedial actions given non-compliance, while New Zealand's cost-recovery principle in setting its safety permit fees provided useful insight into possible charging mechanisms. Brazil's regulator was the only one considered that did not manage safety through issuance and revocation of operating licenses. Although this provided an interesting alternative case study for railway safety regulation, ultimately the concession system was not instructive for permit fee calculations within the South African rail landscape.

Given the heterogeneity of the operating environments, the varying nature of the industries (concentration and systemic significance of operators), the socio-economic landscapes and nuances in the legislated mandates and objectives of the regulators themselves, the exercise of determining what constitutes "best practice" proved to be challenging. From the research and analysis performed it was clear that what is optimal for a particular country and their railway industry may not be for another. The New Safety Permit Fee Model has partially implemented a similar mechanism to the activity-based and cost-recovery principle used in New Zealand. Apart from this, there were no immediate pricing mechanisms upon which to draw example from the other countries investigated.

RSR Proposed Model Review

Outcomes of the RSR Proposed Model Review

The Proposed Model sought to ensure that the safety permit fee calculation remained relevant in a changing rail environment. The calculation addressed several shortcomings in the 2014/15 model including elements of transparency, fairness and predictability. In addition, the fee calculation introduced an incentive for improvement in safety performance of operators which was not achieved through the previous permit fee model.

The funding models of other transport regulatory bodies within South Africa varied in their approaches for charging industry participants. The model used in New Zealand was partially premised on the activity levels of participants while the most significant revenue streams of other regulators arose from penalties and fines imposed on non-compliant participants. The former approach follows a similar principle to the 2014/15 model which was deemed inappropriate for the RSR and the rail industry, while reliance on penalties and fines would not be financially sustainable for the RSR which necessarily must carry out a minimum level of audits and inspections regardless of compliance levels amongst operators in any given year.

The international practices observed did not provide any meaningful calculation mechanisms against which the Proposed Model could be compared, except for New Zealand. New Zealand's cost-recovery approach to fee determination aligned closely with the premise of the RSR's Proposed Model and provided insight into alternative implementation approaches.

The Proposed Model performed well against several principles as outlined by the rail industry operators. Possible areas of improvement were also identified and included inadequate consideration of the ultimate affordability of fees and severity of occurrences for example. The analysis of the Proposed Model, in conjunction with the additional findings from the preceding stages of the project were used in the development of the new Safety Permit Fee Model.

Other Transport Bodies' Funding Models

The 12 public entities under the Ministry of Transport are the Airports Company South Africa (ACSA); PRASA; SANRAL; Ports Regulator of South Africa; Air Traffic and Navigation Services (ATNS); Cross-Border Road Transport Agency (CBRTA); RSR; Road Accident Fund (RAF); Road Traffic Infringement Agency (RTIA); Road Traffic Management Corporation (RTMC); South African Civil Aviation Authority (SACAA) and South African Maritime Safety Authority (SAMSA).

Of the 12 aforementioned entities, five include a mandate of upholding the safety of the industry wherein they operate and regulating the participants within the industry. Other than the RSR, these include:

- Road Traffic Infringement Agency (RTIA)
- Road Traffic Management Corporation (RTMC)
- South African Civil Aviation Authority (SACAA)
- South African Maritime Safety Authority (SAMSA)

The aforementioned entities utilise several differing funding mechanisms, which include fees for services provided, levies collected from a broad base of operators or users, and proceeds from fines for infringements of regulations.

In the case of the RTMC, SACAA and SAMSA, levies are responsible for the generation of the majority of the funds. Such levies are generally activity based, based on the levels of operation of the operators, for example the number of passengers departing or the duration and size of a maritime vessel.

Where such levies are not accurately and reliably measurable, such as in the case of road traffic as regulated by RTIA and RTMC, alternative revenue streams are utilised. The RTIA raises the majority of its revenue from the proceeds from fines for infringements of regulations, while RTMC raises the majority of its revenue from a levy applied to the costs of licensing and renewal of road licenses.

Stakeholder Engagement and Feedback

Stakeholder engagement forms a critical component of the development of new methodologies, helping to identify the needs of key groups and ensuring improved communication channels between the relevant stakeholders. Ultimately, this helps to create support for the outcomes of the projects and reduces the potential for conflict at later stages, as well as aiding in the development of an appropriate methodology incorporating the needs of all relevant parties in a fair and representative manner.

Pre-model development phase stakeholder engagement

Prior to the New Safety Permit Fee Model development phase, communication was sent to the railway operators falling under the jurisdiction of the RSR, explaining the process of review being undertaken with respect to the previous Safety Permit Fee Model. Part of this review process included a questionnaire which was shared with operators in order to understand their perspectives on the current Safety Permit Fee calculation and on the possible areas of improvement for future models.

To avoid ambiguity and to ensure that the terms used in the questions were interpreted as intended and understood consistently across respondents, definitions for the below were provided:

- Risk
- Risk Profile
- Risk Proxy
- Homogenous Risk Groupings
- Occurrence
- Fatalities and weighted injuries (FWI)

To further ensure that the questions were understandable and unambiguous, an initial sample of stakeholders was selected based on their responses to the initial notification of the engagement. The intention of sending only to a smaller sample initially to assess the clarity of questions and any areas of difficulty in completing the survey. The feedback from this sample guided the finalisation of the survey which was then be sent to the entirety of the operators.

The questions were structured to determine the operators' understanding of the current model calculation, risk and their views on various manners to allow for risk in the model.

Stakeholder engagement was conducted using an online survey, utilising the Microsoft Forms platform. Stakeholders were notified of the engagement and contacted via email using the details in the Operators Database as provided by the RSR.

The mass survey was administered on 6 July 2021, and further contact was made with operators on 14 July 2021 and 16 July 2021 requesting submission of responses.

The total responses received at the end of the survey period was 90 out of a database containing 219 operators in total.

Respondents were separated and analysed within their relevant sector used for safety permit fee calculation purposes in the prior model. These include Activity, Mining, Dangerous Goods ("D/G") and Revenue operators. The responses received were approximately proportional to the population contained in the RSR Operator Database, containing 55% Activity, 28% Mining, 11% Dangerous Goods and 6% Revenue operators.

Furthermore, the responses are approximately proportional by region, with the RSR Operator Database containing 54% Gauteng based operators, 26% Kwa-Zulu Natal based operators, and 20% Western Cape Based Operators.

As such, it is believed that the responses received are representative of the relevant sectors and regions.

The key issues raised by the stakeholders and the mechanism used in the new model to address these issues are detailed in the table below:

Key Issue Raised	Mechanism to address key issues in New Safety Fee Permit Model
Lack of understanding of the calculation mechanism.	Simplified and transparent process based on actual performance and activity levels.
Risk not appropriately characterised due to use of incorrect or inappropriate risk proxies and therefore fees are neither risk reflective nor fair. Risk may be more appropriately reflected by number of safety occurrences.	Component of the fee determined based on safety performance as measured by safety occurrences.
Operators who indicated that fees were unaffordable cited decreasing levels of activity and therefore revenue.	Component of the fee has been determined based on levels of activity in order to ensure affordability for smaller and/or declining operators.
Categorisation of different operations not effective.	No particular categorisation of operators is used in the new fee calculation. Conversions between passenger and freight operators are introduced to compare different industries appropriately.

Post- model development phase stakeholder engagement

Four sessions were held in three cities in October 2021 to demonstrate to the operators the first draft of the new model and explain the research and rationale that was applied in the construction of the model. Operators who were unable to attend the physical sessions were able to connect virtually through a Microsoft Teams call which was set up during each of the live sessions. Two sessions were held in Gauteng, while one session was held in each of Cape Town and Durban. These locations were selected based on the high proportion of total railway operators within these areas.

The engagements were aimed at providing operators with an opportunity to voice their initial views on the model and any areas of concern. Operators were taken through a presentation which included a high-level overview of the project phases and the outcomes of these, explanations around the construction and thought process underlying the New Safety Permit Fee Model, as well as a practical demonstration of the calculation mechanism using a demo Microsoft Excel model which was subsequently shared with operators, along with the presentation.

Operators appeared receptive and understanding of the mechanisms underlying the new permit fee calculation. The main points raised by operators appeared to be around implementation issues, and less related with the underlying calculation logic and rationale.

The feedback from these sessions was collated and summarised within a document that was then shared with the RSR. Furthermore, high-level responses and possible actions to be taken with respect to each point were included for consideration by the RSR. As far as possible, amendments to the model were carried out based on the feedback received in the operator sessions.

Development of New Safety Fee Permit Model

Principles Underlying the New Safety Fee Permit Model

The New Safety Fee Permit Model addresses the six principles agreed upon by the railway industry as detailed in the table below:

	Principle	Characteristic(s) of Model
1	Affordability and Economic Neutrality	• Analytics capability allows RSR to see impact on operators and change parameters accordingly. • Ability to introduce cap so that costs are shared more broadly for greater affordability to smaller operators.
2	Equitability and Fairness	• Operators with poorer safety records will pay higher fees. • Operators who are more active and depend more greatly on the rail infrastructure will contribute more to its safety.
3	Predictability and Transparency	• The fee calculation uses industry data that is clear and understandable. • The mechanics of the calculation are not obscured within a "black box".
4	Rationality	• The calculation is rational and is based on operator feedback. • Metrics used to allocate costs are clear and related to safety
5	Flexibility	• The model has several parameters which can be adjusted to reallocate the costs across operators depending on RSR's strategic objectives.
6	Openness and Trust	• The safety permit fee calculation will be discussed with the operators for their comment. • Model was designed based on operator feedback.

Methodology underlying the New Safety Fee Permit Model

The new Safety Fee Permit Model has been developed based on the following two pillars:

1. **Risk-based:** Operator fees are determined through the consideration of operator risk, considering:
   - Safety performance
   - Historic activity levels

2. **Cost-recovery:** Operator fees are dependent on the level of costs incurred by the RSR in executing its legislative mandate. The RSR's costs are spread across the operators based on their level of risk.

These two pillars achieve two important yet distinct outcomes in the fee determination process. The cost-recovery principle is used to determine the total value which will be recovered from Safety Permit Fees charged to the operators. The cost-recovery element of the calculation therefore does not inform the individual fees that are payable by operators, but rather the total value which will be charged in sum across all operators. The risk-based pillar of the calculation is the mechanism by which this total value is then allocated across operators, as determined by their perceived level of risk within the rail industry.

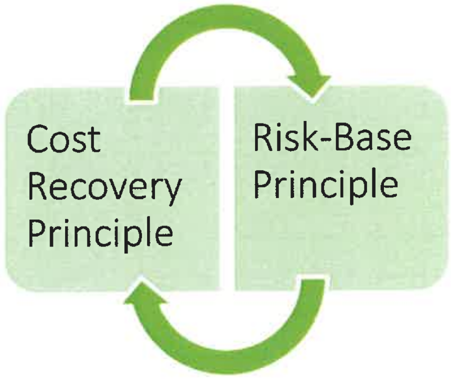
Cost recovery principle of the model

The cost-recovery principle which underpins the New Safety Permit Fee calculation ensures that the income generated from safety permit fees is sufficient to meet the ongoing costs of the RSR with a high degree of certainty. The total costs being recovered through safety permit fees may be offset with other incomes received by the RSR such as the government grant, so that only a portion of the RSR's costs is recouped from operators. Even if such an approach is adopted, the RSR is still assured of generating sufficient revenue across all sources to finance its annual expenses, which ensures the financial sustainability of the regulator.

Operators highlighted during the model demonstration sessions the risk of regulator costs increasingly unjustifiably and without appropriate cost management efforts. This may result in safety permit fees that are unaffordable to operators, given the ability of the RSR to pass down these costs to the operators through the new fee calculation. Operators indicated a risk of forced closure of operations which would reduce the number operators in the industry and increase the subsequent fees charged to operators in future years assuming costs do not reduce with fewer operators. This may exacerbate the problem further which indirectly places a sustainability issue on the RSR itself.

It is of paramount importance given the above discussion that the costs to be recovered from the operators are appropriate and affordably recoverable from the operators. This ensures the financial viability of both operators and of rail as a mode of transport, which in turn strengthens the financial sustainability of the regulator as it depends on the operators for a significant portion of its income.

Although the two pillars appear independent in their roles within the fee calculation, certain dependencies do exist between the two within the fee calculation structure. A detailed explanation of the calculation methodology is provided below, through which this interaction of the cost-recovery and risk-based principles will be become more apparent.



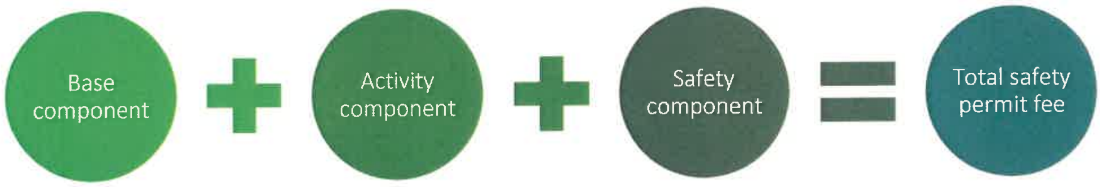
Cost-recovery and risk-based allocation interaction

The costs of the RSR vary by nature, source and activity. The New Safety Permit Fee Model draws a distinction between the different costs in an attempt to achieve a fairer apportionment of costs to the operators. Fairness is perceived within the model construct as the ability to allocate costs to the operators who are most directly responsible for the incurrence of these costs. Three distinct categories were identified as being exhaustive groupings of the costs incurred by the regulator on an annual basis. Each of these categories are allocated across the operators using a different approach based on the nature of these cost categories. Stated differently, the method of allocation is dependent on the nature of the costs so that costs are allocated across operators in a logical and fair manner that distributes the costs to the operators who are most responsible for them. The categories defined within the new model are:

1. Base Costs

2. Safety Costs
3. Activity Costs

Under the New Safety Permit Fee Model, each operator's fee will therefore comprise of a base component, a safety component and an activity related component, each arising from an apportionment of the cost categories outlined above.



Each of the cost categories are, however, allocated across the operators using a different risk-based methodology. The methodology is informed by the nature of the costs, which highlights the interaction between the cost-recovery and risk-based allocation mechanisms used in the model. An outline of each cost category is provided below, as well as the methodology followed to apportion each of these across operators.

Base Costs and Fee Component

Base costs are those which are incurred across all operators and are not particular to the operations or nature of any specific operator. This category might include costs related to safety permit assessments, audits, inspections and the maintenance and running of the NIMS system. These costs either apply to every operator without distinction, such as safety permit assessments which must be undertaken by each operator; or alternatively are not attributable to any specific operator but arise due to activities which serve to benefit all operators to a similar degree – for example the NIMS-related costs.

Base costs are intended to be a relatively small proportion of costs, and as such can be spread relatively evenly across operators, regardless of their size. This treatment of equal allocation across operators also aligns with the nature of Base costs as described above, in that all operators are expected to derive a similar benefit from the activities giving rise to these expenses, or that each operator imposes a similar expense on the RSR for these particular activities. The Base cost component of the fee is the only component that is not explicitly risk-based, and instead recognises that every railway operator should contribute at least some amount towards the functioning of the RSR due to the benefit derived from safer railways and to compensate the regulator for the work that it does in managing railway safety. The remaining fee component will be driven by the perceived operator-specific risk posed to the rail system, and hence to the RSR in achieving its safety mandate.

Safety Costs and Fee Component

Safety costs arise when the RSR is required to undertake an activity as a direct result of a safety-related incident, or in the execution of duties that closely align with the regulator's "Railways are safer" outcome. These costs might arise due to investigation callouts for railway occurrences (incidents) and related activities, railway safety educational campaigns and safety management activities.

The revised permit fee calculation applies the logic that the operators who are less safe and hence pose greater risk within the rail ecosystem are responsible for a larger proportion of the safety-related costs incurred by the RSR. This can be argued by considering both the direct impact of less safe operators, necessitating investigation callouts and occurrence-related regulatory activities, and the indirect outcomes such as a greater need for safety education campaigns.

Risk in the context of the safety costs is measured by the historical occurrences of the operators. The measurement period for historical occurrences is left as a parameter within the model which can be changed by the user. The use of occurrences aligns with the responses received from operators in the questionnaire whereby 78% of respondents selected occurrences as the most appropriate proxy for risk.

Activity Costs and Fee Component

Activity costs may be considered as arising from non-core activities in the execution of the safety mandate of the RSR. As such, these will include operational expenses that the RSR incurs in executing its day-to-day activities.

Activity costs are attributed across the operators based on their historic tonnages and number of passengers transported. Operators that make greater use of the railway network as assessed by their tonnage and passenger numbers are deemed to carry greater safety risk and therefore contribute proportionally to the activity costs of the RSR. The rationale underlying this risk-based allocation mechanism includes several arguments, but most importantly that larger and more active operators that depend more extensively on the safety of the railway network, should contribute to a greater extent to the Activity costs of the regulator that oversees this safety. Additional arguments support that larger and more active operators:

1. Have a greater responsibility related to safe operations given their more extensive use of the network and hence greater risk exposure. In this sense, operators are not being judged on their historic safety performance but on their exposure to risk and hence greater need for and dependence on railway safety regulation.

2. More likely have railway activities as part of their core operations. These operators derive a greater financial benefit from the use of the railways and therefore may be expected to pay for this benefit to a greater extent, otherwise the benefits would far outweigh the "cost" of using rail transport and an economic imbalance would emerge.

3. Are more financially capable of funding the regulation of railway safety which is for the benefit of all operators and the public. This may be likened to the reasoning for progressive taxes which place greater financial requirements on those with the means to support these.

Financial Projections and Analysis

The modelling and analysis performed using the new Safety Permit Fee Model involved a scenario analysis which considered the fee output across operators under various model parameters. This was deemed to be the more informative than time series modelling which necessarily involves a stochastic (random variable) element and would have been more insightful in the case that the RSR had uncertainty between the level of fee income and their operating costs. The construct of the new Safety Permit Fee Model is such that the RSR is not at risk of incurring greater costs relative to permit fees given that the calculation is premised on a cost-recovery principle each year. Understanding how the RSR's costs are attributed across operators therefore becomes more relevant in this context and is covered in the analysis below.

Data

In order to run the model, the following data is required:

- A complete list of active operators at the time of calculation
- The safety record of each active operator over a selected historic period. The safety record should include the date of occurrence, and the category of occurrence.
- The historic activity of the operator in the form of passenger km's, tonne km's and dangerous goods tonne km's, for each year within a selected historic period.

- The cost data for the RSR split out into the Base Costs, Activity Costs and Safety Costs. Any additional income streams such as the government grant or interest income are also required and are used to reduce the total cost base.

The use of passenger km and tonne km as a measure of activity has been informed by global practice as observed. The Railway transport measures page of the Eurostat website states that "'Tonne-kilometre' or 'passenger-kilometre' are the best measures for comparing transport modes and countries, because the use of tonnes or passengers entails a high risk of double counting." Furthermore, it is noted that the Organisation for Economic Co-operation and Development (OECD) also makes use of these two activity measures when quoting transport activity across road, rail and water, as well as when considering railway efficiency. In the case of this model, it was decided that based on the available evidence and the purpose of the model, passenger km and tonne km were most appropriate as the measures of activity for operators. In particular, it was determined that the use of passengers and tonnages only was inadequate and that the distinction necessarily be made between a passenger that travels 1km relative to a passenger that travels 100km's on a train, with the latter being exposed to considerably more safety risk (and the same argument for tonnage and tonnage kms).

The cost data used in the modelling exercise was provided by the RSR has not been verified or checked for accuracy. The data has been relied on for the purpose of this modelling exercise and may be changed at a later date after further discussions with stakeholders. The activity data was similarly received from RSR based on submissions made by operators and has not been verified for accuracy.

Parameters

The parameters which are required within the model include:

- The occurrence category severities which determine the weighting of each occurrence category in the calculation. Higher severities will carry greater weight and will therefore attract a greater share of costs.

- Passenger km to General Freight km relationship, which is an indication of the number of tonne km's which equal one passenger km. A greater value places greater weight on passenger km's and so passenger trains will attract a greater proportion of activity-related costs.

- Dangerous goods tonne km to General Freight km relationship, which is an indication of the number of tonne km's which equal one dangerous goods tonne km. A greater value places greater weight on dangerous goods tonne km's and so dangerous goods trains will attract a greater proportion of activity-related costs relative to freight trains.

- The historic period over which operator activity will be considered in the calculation.

- The historic period over which operator safety records will be considered in the calculation.

The occurrence category severities were set by the RSR based on their interpretation of which occurrences pose greater safety risks within the rail system. The ratings scale runs from 0-5, with 0-rated occurrences carrying no weight in the calculation. These occurrences are considered as immaterial to rail safety, while occurrences rated 5 bear the greatest weighting in the calculation. Operators that experience occurrences of severity 5 will receive a greater safety cost component to their overall permit fee. The rationale underlying this model component is to distinguish between occurrences that are inconsequential from a safety perspective relative to those which the RSR considers of great significance and aims to reduce in ensuring rail safety.

Scenario Analysis

A scenario analysis exercise was carried out to consider the fees that are outputted by the model under a range of conditions and parameter selections. This is to provide an idea of how the calculation mechanism distributes RSR costs across operators and why this is considered to be logical, transparent, fair and economically neutral. From the scenarios considered, a recommendation is made regarding the most appropriate parameterisation based on initial modelling with respect to the principles of the operators and the requirements of the RSR for a risk-based permit fee. It is imperative to note that the actual fee output in the scenarios is of less importance than the changes to the fees. The scenario analysis is intended to provide insight into the impact of changing parameters in the model, whereas the fee output is not final because the final operator data is still being collected and processed for use. Six distinct scenarios are considered in the section below, each with different parameters being adjusted. A summary of the output is provided at the end of analysis for ease of comparison. The six selected scenarios are by no means exhaustive and the model allows for infinitely more configurations to be projected. The RSR may decide that further investigation and modelling is required in which case the model may be adjusted and run accordingly. One of the key focus areas in building the model was to ensure that it remained dynamic and amenable to various parameterisations. This empowers the RSR with the ability to adjust the parameters so that the outcome which best aligns with their strategic safety objectives and mandate is obtained.

Of note is that passenger and tonne kilometres (km) were selected as the most appropriate metrics for gauging the level of activity of the rail operators within the model context and fee calculation. Due to data limitations, these two metrics were unavailable from all operators at the time of modelling and so distance travelled in km's was used instead. The use of distance travelled, although not intended for use in the model, still serves as an acceptable proxy for activity levels and allows detract from the ability to appreciate the impact of changing the various assumptions and parameters within the model. The scenario analysis and the outcomes presented therefore remain relevant from a demonstrative perspective although the recommended activity proxy should be used for the final fee determination. Of particular note is that all the scenarios are for illustration purposes only and that the final fee output is dependent on the data that is ultimately inputted into the model.

The parameters that were adjusted across the five scenarios include:

- Passenger km to General Freight km relationship
- Dangerous goods tonne km to General Freight km
- Size and allocation of government grant to offset against RSR costs
- Historic period over which railway safety occurrences are considered

The historic period for operator activity was not adjusted as only a single year of data was available. In future, the model user may select a broader historic timeframe over which to consider operator activity. Through the various engagements with operators, including the questionnaire and the demonstration sessions, it was apparent that a historic timeframe longer than 1 year was preferred by operators so that the variability of permit fees over time was smoother and less dominated by single years of data which may be outliers in the broader context of operation. This is particularly true for the safety element of the permit fee calculation, as an operator may have a single year with many occurrences but a good safety track record over a longer timeframe. In this case, the operator should not be unduly punished with consideration only to their worst year of safety performance.

The Appendix includes the previous and newly calculated safety permit fees for all operators from each scenario described below for reference.

Scenario 1: Base Scenario

Scenario 1 has been selected as the Base Scenario for ease of understanding the impact of changing the parameters in the Model. There is no particular significance in choosing this parameterisation as the Base Scenario, other than its use as a reference point against which other scenarios can be compared.

Cost Assumptions

Base Costs	R3 368 907
Safety Costs	R137 974 247
Activity Costs	R54 344 517
Total costs	**R195 687 671**
Government Grant	R60 000 000
Allocation to activity	100%

Data Assumptions

Historic Occurrence Period	2018-2019

Activity Assumptions

Passenger km -> General Freight tonne km	1
DG tonne km -> General Freight tonne km	1

Scenario 1 uses the costs as provided by the RSR in the various cost categories. An assumption is made of a R60 000 000 government grant which is received and offset entirely against the activity costs (indicated by the 100% field). Without the government grant, Activity Costs would be R60 000 000 higher and as a result Total costs would equal R255 687 671. The choice of government grant value was informed by historic values received by the RSR from the Department of Transport.

A two-year period over 2018 and 2019 was selected for historic safety performance measurement within the model. Based on this selected period, the below table illustrates the 10 operators with the greatest number of severity-weighted occurrences. The severity-weighted occurrence values are obtained by calculating the sum of each operator's occurrences over each year within the selected period, with each occurrence value determined by its severity (as described under the parameters sub-section above). The average of the years within the selected period is then taken to obtain the result.

Safety

Rank	Operator	Severity Weighted Occurrences	% Total
1	OPERATOR 207	52 721	49.52%
2	OPERATOR 149	52 126	48.96%
3	OPERATOR 28	910	0.85%
4	OPERATOR 92	103	0.10%
5	OPERATOR 165	58	0.05%
6	OPERATOR 170	56	0.05%
7	OPERATOR 213	42	0.04%
8	OPERATOR 208	40	0.04%
9	OPERATOR 88	31	0.03%
10	OPERATOR 173	29	0.03%

From the above it is evident that Operator 207 and Operator 149 comprise the majority of all occurrences in the industry over the selected period (over 98%). The implication of this is that 98% of Safety Costs will be allocated across these two operators, while the remaining operators will receive the remaining 2% based on their percentage of total severity weighted occurrences.

The Passenger km to General Freight tonne km parameter has been set to represent a 1:1 relationship. This means that every 1 passenger km travelled is equivalent to 1 tonne km travelled. Similarly, by setting the Dangerous Goods (DG) tonne km to General Freight tonne km relationship equal to 1, both metrics are treated equally.

The below table displays the 10 most active operators as measured by the sum of their passenger kms, general freight kms and dangerous goods kms, where no adjustments are made to these metrics.

Activity

Rank	Operator	Total Activity	% Total
1	OPERATOR 207	40 424 133 135	95.33%
2	OPERATOR 61	1 404 857 297	3.31%
3	OPERATOR 28	456 000 000	1.08%
4	OPERATOR 29	34 965 684	0.08%
5	OPERATOR 171	25 001 329	0.06%
6	OPERATOR 149	24 975 149	0.06%
7	OPERATOR 121	15 000 000	0.04%
8	OPERATOR 176	4 650 000	0.01%
9	OPERATOR 31	4 457 828	0.01%
10	OPERATOR 10	4 369 898	0.01%

Operator 207 again is resoundingly the most active operator based on their level of tonnage kms travelled. The data indicates that Operator 207 will be paying 95.33% of the Activity costs as shown in the Cost Assumptions table above. Operator 61 is the next most active operator based on the data received, followed by Operator 28.

Based on the parameterisation above, the following fees are produced by the model for the "Big Three Operators" consisting of Operator 207, Operator 149 and Operator 28.

Big Three Operators

Operators	Fee % Change	Fee R value Change	Previous Fees	New Fees
OPERATOR 207	4.82%	R5 526 620	R114 630 293	R120 156 913
OPERATOR 149	97.87%	R33 442 920	R34 170 032	R67 612 952
OPERATOR 28	-38.56%	-R1 116 951	R2 896 604	R1 779 653
Grand Total	**64.13%**	**R37 852 590**	**R151 696 928**	**R189 549 518**

The model suggests that both Operator 207 and Operator 149's fees increase by R5.5m and R33.4m respectively, while Operator 28's should decrease by R1.1m. This outcome is expected given that Safety costs for this scenario equal R138m, and based on safety performance, Operator 207 and Operator 149 are required to pay 49.52% and 48.96% of this amount respectively. Furthermore, Operator 207 is deemed the most active operator by a significant margin and therefore is required to cover the majority of the R54.3m Activity costs.

The below two tables show the five largest fee increases and decreases as measured by rand value respectively.

Biggest Fee Increases

Operator	Fee % Change	R value Change	Previous Fees	New Fees
OPERATOR 149	97.87%	R33 442 920	R34 170 032	R67 612 952
OPERATOR 207	4.82%	R5 526 620	R114 630 293	R120 156 913
OPERATOR 61	615.91%	R1 568 005	R254 585	R1 822 590
OPERATOR 121	233.75%	R24 489	R10 476	R34 966
OPERATOR 213	48.91%	R23 066	R47 165	R70 231

Operator 149, Operator 207 and Operator 61 experience the three largest fee increases with each being in excess of R1m. Operator 61's larger fee has been driven by the large activity value relative to the other operators. The next largest fee increase is only of the magnitude of R24 489, with every other fee increase falling below this level. This outcome therefore is most likely an affordable one for most operators, excepting the three which have experienced significant increases.

Biggest Fee Decreases

Operator	Fee % Change	R value Change	Previous Fees	New Fees
OPERATOR 13	-97.54%	-R2 218 667	R2 274 591	R55 924
OPERATOR 10	-98.56%	-R1 461 228	R1 482 571	R21 343
OPERATOR 179	-98.14%	-R1 241 318	R1 264 838	R23 520
OPERATOR 178	-98.20%	-R1 212 971	R1 235 195	R22 224
OPERATOR 28	-38.56%	-R1 116 951	R2 896 604	R1 779 653

It is evident that several operators experience significant fee decreases, with the top four decreases all being in excess of 97%. The change in these fees is driven by low relative activity on the network and strong safety performance, which results in low Safety and Activity fee components to their overall Safety Permit Fees.

Scenario 2: Passenger km to General Freight tonne km adjustment

Scenario 2 is identical to Scenario 1 in all respects except for the Passenger km to General Freight tonne km parameter which has been set to represent a 1:5 relationship. This means that every 1 passenger km travelled is equivalent to 5 tonne km travelled. This is incorporated into the model by dividing the tonne km's of all operators by 5, which reduces the level of activity for general freight operators and hence places a greater emphasis on passenger trains and their level of activity. The Dangerous Goods (DG) tonne km to General Freight tonne km relationship remains equal to 1, suggesting that dangerous goods tonne km's are treated the same as general freight tonne km's.

Cost Assumptions

Base Costs	R3 368 907
Safety Costs	R137 974 247
Activity Costs	R54 344 517
Total costs	**R195 687 671**
Government Grant	R60 000 000
Allocation to activity	100%

Data Assumptions

Historic Occurrence Period	2018-2019

Activity Assumptions

Passenger km -> General Freight tonne km	5
DG tonne km -> General Freight tonne km	1

The effect of this change is observed in the model through the total activity of each operator. Whereas in Scenario 1 Operator 207 accounted for 95.33% of all activity, while Operator 28 and Operator 149 accounted for 1.08% and 0.6% respectively, these three operators now account for 91.19%, 5.14% and 0.28% respectively. Both Operator 28 and Operator 149 experience an increase in their relative level of activity because passenger km's are given greater weighting in the calculation as explained above. As a result, Operator 207 experiences a decline in its relative activity level.

Activity

Rank	Operator	Total Activity	% Total
1	OPERATOR 207	8 084 828 025	91.19%
2	OPERATOR 28	456 000 000	5.14%
3	OPERATOR 61	280 972 423	3.17%
4	OPERATOR 149	24 975 149	0.28%
5	OPERATOR 29	6 993 137	0.08%
6	OPERATOR 171	5 000 266	0.06%
7	OPERATOR 121	3 000 000	0.03%
8	OPERATOR 176	930 000	0.01%
9	OPERATOR 31	891 566	0.01%
10	OPERATOR 10	873 980	0.01%

The outcome of this one the fees of the Three Big Operators is that both Operator 28 and Operator 149 experience fee increases while Operator 207's fee decreases from that calculated in Scenario 1, but still remains above its most recent Safety Permit Fee of R114 630 293.

Operators	Fee % Change	Fee R value Change	Previous Fees	New Fees
OPERATOR 207	2.86%	R3 277 786	R114 630 293	R117 908 079
OPERATOR 149	98.23%	R33 563 999	R34 170 032	R67 734 031
OPERATOR 28	37.76%	R1 093 721	R2 896 604	R3 990 325
Grand Total	138.84%	R37 935 506	R151 696 928	R189 632 435

Scenario 3: Passenger km to General Freight tonne km and Dangerous Goods (DG) tonne km to General Freight tonne km adjustments

The parameters for the Passenger km to General Freight tonne km relationship and DG tonne km to General Freight tonne km relationship are adjusted in Scenario 3 from the Base Scenario.

Cost Assumptions

Base Costs	R3 368 907
Safety Costs	R137 974 247
Activity Costs	R54 344 517
Total costs	**R195 687 671**
Government Grant	R60 000 000
Allocation to activity	100%

Data Assumptions

Historic Occurrence Period	2018-2019

Activity Assumptions

Passenger km -> General Freight tonne km	10
DG tonne km -> General Freight tonne km	5

The impact of increasing the Passenger km to General Freight tonne km parameter to 10 is to place even greater weight on passenger km's relative to tonne km's. Changing the DG tonne km to General Freight tonne km parameter to 5 results in 1 DG tonne km being set equal to 5 General Freight tonne km's. DG tonne km's are therefore treated with greater weight in the calculation which may be done to reflect the greater risk that may be attributable to an operator carrying dangerous goods as oppose to general freight. This also effectively sets the Passenger km to DG tonne km relationship to 1:2, meaning 1 Passenger km is equal to 2 DG tonne km's, implying a Passenger km still poses greater safety risk than a DG tonne km.

Activity

Rank	Operator	Total Activity	% Total
1	OPERATOR 207	4 042 414 887	86.26%
2	OPERATOR 28	456 000 000	9.73%
3	OPERATOR 61	153 141 833	3.27%
4	OPERATOR 149	24 975 149	0.53%
5	OPERATOR 29	3 496 568	0.07%
6	OPERATOR 171	2 500 133	0.05%
7	OPERATOR 121	1 500 000	0.03%
8	OPERATOR 176	465 000	0.01%
9	OPERATOR 31	445 783	0.01%
10	OPERATOR 10	436 990	0.01%

The outcome of these changes is for Operator 207's relative share of total rail industry activity to come down further to only 86.26%, while Operator 28 and Operator 149 experience increases in their shares given the increase in the Passenger km to General Freight tonne km parameter. This translates into a significantly larger fee for Operator 28 and Operator 149, while Operator 207's fee only goes up marginally from its latest Safety Permit Fee, but achieves the lowest fee out of the scenarios considered thus far.

Operators	Fee % Change	Fee R value Change	Previous Fees	New Fees
OPERATOR 207	0.52%	R599 887	R114 630 293	R115 230 179
OPERATOR 149	98.63%	R33 700 539	R34 170 032	R67 870 571
OPERATOR 28	123.82%	R3 586 691	R2 896 604	R6 483 295
Grand Total	222.97%	R37 887 117	R151 696 928	R189 584 045

Scenario 4: Government grant is used to reduce both Safety and Activity costs in a 50:50 split

In this scenario, the R60 000 000 government grant is no longer used to reduce only the Activity Costs but is split into two parts of R30 000 000 which are then used to reduce the Safety Costs and the Activity Costs. The result is Safety Costs which are lower than in the Base Case, and Activity Costs that are R30 000 000 higher than in the Base Case.

Cost Assumptions

Base Costs	R3 368 907
Safety Costs	R107 974 247
Activity Costs	R84 344 517
Total costs	**R195 687 671**
Government Grant	R60 000 000
Allocation to activity	50%

Data Assumptions

Historic Occurrence Period	2018-2019

Activity Assumptions

Passenger km -> General Freight tonne km	5
DG tonne km -> General Freight tonne km	1

The relative safety performance of operators remains unchanged, and the relative activity levels is equal to the that shown in Scenario 2 (based on the same Activity Assumption settings). The result of this is that Operator

207's fee increases considerably to the largest level seen in all the scenarios, while Operator 149's is the lowest relative to the other scenarios, but still reflects a 55.48% increase relative to its latest actual safety permit fee cost of R34 170 032.

Operators	Fee % Change	Fee R value Change	Previous Fees	New Fees
OPERATOR 207	13.76%	R15 775 790	R114 630 293	R130 406 082
OPERATOR 149	55.48%	R18 957 678	R34 170 032	R53 127 710
OPERATOR 28	82.17%	R2 380 214	R2 896 604	R5 276 817
Grand Total	151.42%	R37 113 681	R151 696 928	R188 810 610

The Model also projects a large increase in Operator 28's fee. Operator 207 and Operator 28 are adversely affected by the parameterisation of this scenario because both have relatively high activity levels, while Operator 149 does not. Operator 149 has a relatively poor safety record and Scenario 4 reduces the Safety Costs which by allocating a portion of the government grant to it. At the same time, the Activity Costs are increases, with the outcome that more active operators pay higher fees while operators with poor safety records are not penalised as severely as the earlier Scenarios.

Scenario 5: Government grant is increased to R80 000 000 and split between Safety Costs and Activity costs in 1:3 proportion

Scenario 5 considers a situation whereby the government grant is increased to R80 000 000 from R60 000 000. This is akin to considering a scenario whereby the RSR is able to reduce its costs by R20 000 000 given that the grant is used to offset the costs. The R80 000 000 is used to decrease the Safety Costs by R20 000 000 and the Activity Costs by R60 000 000.

Cost Assumptions

Base Costs	R3 368 907
Safety Costs	R117 974 247
Activity Costs	R54 344 517
Total costs	**R175 687 671**
Government Grant	R80 000 000
Allocation to activity	75%

Data Assumptions

Historic Occurrence Period	2018-2019

Activity Assumptions

Passenger km -> General Freight tonne km	5
DG tonne km -> General Freight tonne km	1

The result of a decrease in Total costs to R175 687 671 from R195 687 671 is that all operators will experience a decrease in safety permit fees relative to Scenario 2 which has the same Activity Assumptions parameterisation.

Operators	Fee % Change	Fee R value Change	Previous Fees	New Fees
OPERATOR 207	-5.78%	-R6 627 893	R114 630 293	R108 002 399
OPERATOR 149	69.56%	R23 770 113	R34 170 032	R57 940 145
OPERATOR 28	31.86%	R922 742	R2 896 604	R3 819 346
Grand Total	95.64%	R18 064 962	R151 696 928	R169 761 890

Operator 207's fee actually reduces from its last actual Safety Permit Fee cost, while Operator 149 and Operator 28 still experience increases in the fees relative to their last actual Safety Permit Fees, although the increases are lower compared to Scenario 2 as discussed.

Scenario 6: Historic period for safety performance changed

The historic period over which the occurrences of operators are considered is changed to the two year period of 2019 and 2020. The costs are reverted back to their original values, while the Activity Assumptions remain the same as Scenario 2.

Cost Assumptions

Base Costs	R3 368 907
Safety Costs	R137 974 247
Activity Costs	R54 344 517
Total costs	**R195 687 671**

Government Grant	R60 000 000
Allocation to activity	100%

Data Assumptions

Historic Occurrence Period	2019-2020

Activity Assumptions

Passenger km -> General Freight tonne km	5
DG tonne km -> General Freight tonne km	1

Given this change, the relative safety performance of operators changes as shown in the table below. Operator 207 appears to contribute a far greater number of severity weighted occurrences and hence will incur 57.94% of the total Safety Costs as a result, while Operator 149's proportion decreases.

Safety

Rank	Operator	Severity Weighted Occurrences	% Total
1	OPERATOR 207	56 331	57.94%
2	OPERATOR 149	39 652	40.79%
3	OPERATOR 28	761	0.78%
4	OPERATOR 92	70	0.07%
5	OPERATOR 165	59	0.06%
6	OPERATOR 213	44	0.05%
7	OPERATOR 170	37	0.04%
8	OPERATOR 193	20	0.02%
9	OPERATOR 88	18	0.02%
10	OPERATOR 178	17	0.02%

The result on Safety Permit Fees is as expected with Operator 207 experiencing a far greater calculated fee while Operator 149's fee decreases relative to other scenarios based on the model and the specified date range.

Operators	Fee % Change	Fee R value Change	Previous Fees	New Fees
OPERATOR 207	12.99%	R14 893 489	R114 630 293	R129 523 782
OPERATOR 149	65.20%	R22 277 971	R34 170 032	R56 448 002
OPERATOR 28	34.33%	R994 296	R2 896 604	R3 890 900
Grand Total	112.52%	R38 165 755	R151 696 928	R189 862 684

The above scenarios indicate that the risk-based model assesses Operator 149's current fees to be too low when considering its historic level of safety occurrences and relative activity level within the industry. In all scenarios Operator 149's fees increase significantly, with the best outcome achieved where Safety costs were reduced to the greatest extent. The first three scenarios involve changes to the passenger km and tonne km relationships. It is evident that the scenarios analysed do not impact Operator 149's calculated fees to the same extent as Operator 28, because Operator 28 has a greater level of relative activity and is therefore impacted to a larger degree when passenger km's are weighted more heavily within the calculation. Both Operator 207 and Operator 149 experience large decreases in calculated fees in Scenario 5 which assumes the receipt of a larger government grant, spread across both Safety Costs and Activity Costs.

Operator	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
OPERATOR 207	R120 156 913	R117 908 079	R115 230 179	R130 406 082	R108 002 399	R145 264 602
OPERATOR 149	R67 612 952	R67 734 031	R67 870 571	R53 127 710	R57 940 145	R67 818 539
OPERATOR 28	R1 779 653	R3 990 325	R6 483 295	R5 276 817	R3 819 346	R5 533 286

Given historical government grant values and an indication from RSR that the Department of Transport does not aim to increase their annual grant in the future, it is prudent to consider Scenario 5 as unlikely to materialise in the near future. The Activity costs as categorised by the RSR are considered to be non-core to the execution of their safety mandate. Based on discussions it was therefore determined that the grant and other income should be used to offset these costs as far as possible, with the implication that Scenario 4 is not a preferred parameter configuration for the calculation of fees. Scenarios 1 and 3 are also not considered as optimal parameterisations given the selected relationships between passenger and freight activity.

An investigation was conducted in order to determine an appropriate value for the relationship between passenger km's and tonne km's such that the two measures could be compared on an equitable basis. Under the "Methodology underlying the New Safety Fee Permit Model" section of the report, an argument is provided for the use of activity levels in determining a component of the safety permit fee. The rationale underlying this activity risk-based allocation mechanism is supported by several arguments which include the reasoning that operators who derive a greater financial benefit from the use of the railways and are likely to place greater value on its use and be more willing to pay for this benefit. Furthermore, these operators may be expected to contribute to the RSR's activity costs to a greater extent otherwise the benefits that they accrue from the use of the rail network would far outweigh their "cost" of using rail and an economic imbalance would emerge. These operators may also be deemed to be more financially capable of funding the regulation of railway safety which is for their own financial benefit to a greater extent than other operators. For these reasons, the revenue generated per passenger km travelled for Operator 149 was compared to the revenue generated per tonne km for Operator 207, these operators being two of the largest and most instrumental passenger and freight railways within South Africa respectively. The analysis of data from the financial years 2018/2019 and 2019/2020 indicated that Operator 149 was able to achieve between R3.64 and R3.76 per passenger km travelled (excluding fare evasions) while Operator 207 achieved R0.51 per tonne km travelled.

Financial Year	OPERATOR 149 Revenue	OPERATOR 149 Activity (million passenger km's)	Rand per passenger km
2019/2020	R630 883 000	168.0	R3.76
2018/2019	R1 038 467 000	285.0	R3.64

Financial Year	OPERATOR 207 Revenue	OPERATOR 207 Activity (billion tonne km's)	Rand per tonne km
2019/2020	R75 065 000 000	145.8	R0.51
2018/2019	R74 070 000 000	146.0	R0.51

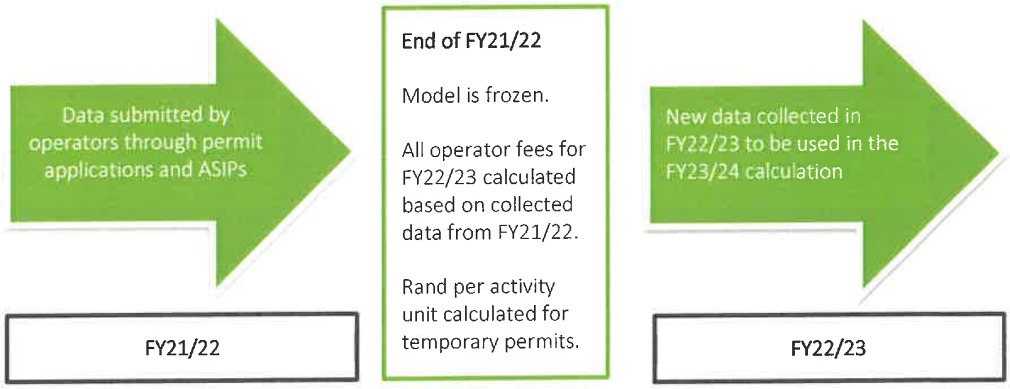
Further computation indicates that Operator 149 is able to achieve on average 7.24 times more revenue for every passenger km travelled, relative to every tonne km travelled by Operator 207. A similar analysis of European rail data showed that the revenue generated per passenger km was between 2.95-3.93 times greater than the revenue generated per tonne km. This provides an argument to use a parameter of 5 for this relationship, as this lies approximately between the South African and European data and can be considered a fair proxy. Scenarios 2 and 6 employ this parameter setting.

Scenarios 2 and 6 are therefore deemed most representative of parameterisations that meet the fee calculation principles to the greatest extent. The only difference between these two is the choice of historic period over which occurrences are considered. The actual permit fee calculation will most likely be performed on the most recent data such as 2020 and 2021 data which will most likely reflect the operating landscape in a post-COVID environment most accurately and so should be considered as the parameterisation used. From the results above it is clear that this will have large implications on the calculated fees but can be considered most fair given that the operators that are most active and therefore most able to support higher fees.

Implementation considerations for the model

The model calculation is such that the safety permit fee charged to an operator is based on their safety performance and activity levels relative to other operators in the industry. The calculation therefore requires complete safety and activity data from all operators at a point in time to achieve a fair and representative calculation. Missing or inaccurate information from one operator will skew the figures for other operators and result in fees that are not representative of their true relative levels of safety and activity in the industry. Similarly, the introduction of new information (activity and/or safety) will change the relative values between operators and hence the fees of all operators.

Operators do not apply for safety permits or submit their annual safety improvement plans (ASIPs) at the same time over the year. Given that data is not collected simultaneously from all operators, the problem described above arises if fees are calculated each time an operator submits an application or an ASIP. If the model were to be run each time new information was collected from an operator, each operator's fee would be determined based on a different set of data and therefore not on a consistent basis across all operators. In order to ensure fair treatment to all operators, it is recommended that the RSR "freeze" the model at its year-end, and use the safety and activity data at that point for the calculation of all safety permit fees for the next financial year. The word "freeze" is used to indicate that the same data will be used to calculate the safety permit fee for all operators for the next financial year, without the introduction of any new data. Any new data collected after this point is stored in the model to be used for the next financial year's calculation. This ensures that all operators' fees are calculated based on the same data and relative to the same industry figures. This also assists with the calculation of temporary and construction safety permit fees and ensures that these are consistent with the treatment of all other operators. Temporary and construction safety permit fees can be calculated by taking the rand per activity unit which is outputted by the model, and multiplying this to the total expected number of passenger and tonnage km's that are submitted by the operator applying for the temporary or construction permit. The below provides a visual depiction of the timeline and process for safety permit fee calculations.



Operators submit data over the Financial Year 2021/22 (FY21/22) through their safety permit applications and ASIPs. At the end of FY21/22, the RSR will have data for every operator in the industry. This information will be used to calculate the fees for all operators for FY22/23. The rand per activity unit is also calculated using this data by taking the total activity costs and dividing by the total activity across all operators in the FY21/22 financial year. Any new operators or operators seeking temporary or construction safety permits will have their permit fee calculated by taking the rand per activity unit and multiplying this to their estimated level of activity. The model has functionality which allows for the estimated activity to be inserted and the fee to be automatically calculated.

The data collected in FY22/23 will be stored in the model for use in the FY23/24 calculation in the same manner as described above.

Financial Sustainability and Viability of the RSR

The RSR requires adequate and sustainable financing in order to execute its mandate and has historically received this through Safety Permit Fees and the annual government grant.

Employee-related costs are the regulator's most significant operating expense component and are directly related with the level of its supervision activities which are incurred in the execution of its legislated mandate and functions. These expenses arise from RSR's main operational functions of performing inspections, audits and investigations to ensure continued safety within the rail industry.

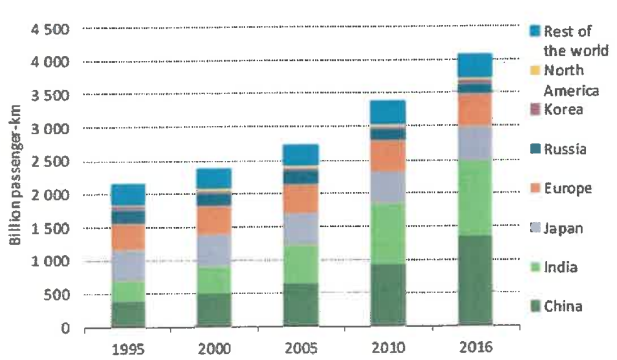
An analysis of the main revenue streams and costs of the RSR reveals an increasing importance of the Safety Permit Fees in the financial sustainability of the regulator. The proportion of the RSR's total revenue comprised of these fees has increased over time from about 50% of total revenue in 2016 to 70% in 2020, while the share of the government grant has remained fairly stable over time. It is further noted that revenue from technology audits would not be received in future, suggesting greater dependence on the two income streams highlighted above. Given that the new Safety Permit Fee is premised on cost-recovery, the RSR will have certainty of meeting its costs to the extent that railway operators are able to afford the fees being levied. This construct places a responsibility of cost containment and discipline on the RSR, which will be required to balance their cost needs against the affordability of safety permit fees for operators.

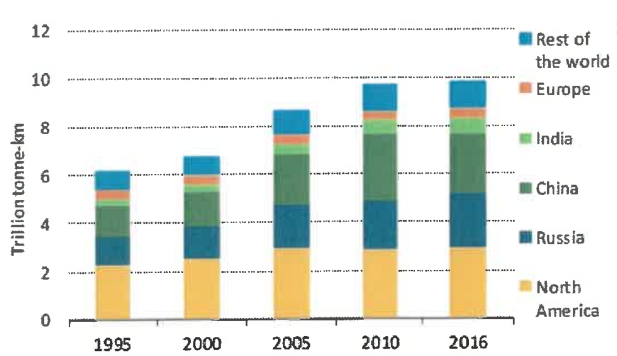
The attainment of a safer railway operating environment underpinned by a strong safety culture across all operators therefore not only achieves the objectives as set out by the NRSR Act, but also supports the sustainable operation of the RSR by lowering its costs of supervision, which may in turn reduce the extent to which this cost burden is passed on to operators through fees.

The financial viability of the RSR therefore depends to a large degree on the financial condition of operators themselves and their ability to finance safety permit fees which comprise a large portion of the RSR's revenue. The health of the rail industry is therefore an important factor in the long-term sustainability of the RSR. The next section assesses this aspect through consideration of global trends in the rail and contrasts this to the South African rail environment. A stronger prospect of rail growth in South Africa would provide greater financial comfort for the RSR, although this aspect is largely out of the direct control of the RSR. The financial strength of the rail operators depends on exogenous factors but also on their own operational and management efficiency.

Expectation of demand and market trends

Both passenger and freight rail activity have experienced increasing volumes globally over recent years. The graphics below show the trends described were included in a report issued by the International Energy Agency in 2019, titled "The Future of Rail: Opportunities for energy and the environment". It is expected that global rail freight volumes measured in tonne-kilometres will grow at a rate of 2% per annum until 2025, according to a report published to ResearchAndMarkets.com titled "Rail Freight Transport Market - Growth, Trends, and Forecast (2020 - 2025)".





Despite growth in size of both passenger and freight rail markets, rail has lost modal market share in certain regions to road and other transportation methods, while gaining in others. This is dependent on market factors which will be assessed relative to those in a South African context below.

Some of the reasons cited for freight rail losing global market share to other transportation modes include:

- The lack of price competitiveness as road transport becomes more efficient
- A loss or decline of key customer industries, for example the decline in coal freight in Europe followed a reduction in coal production of 60 percent between 1990 and 2019
- The exit from the provision of unprofitable railway services (single wagonload, break bulk transport, and expedited overnight services).

Another obstacle to global growth in the rail industry, in particular with respect to passenger travel, includes a paradigm shift which was introduced by the COVID-19 pandemic. This event instituted a shift in the manner in which business is conducted and the extent to which work travel is required by employers and clients. It appears that remote working and virtual meetings will remain a permanent fixture in the future of work which reduces the need for day-to-day travel by business professionals.

Given that the above points were made in a global context, their relevance within the South African market may not be as acute as others. In particular, the International Transport Forum notes that it is difficult to benchmark the efficiencies of railway systems across different countries because of differences in:

- The goals and roles of railways
- Network and operations characteristics.
- Railway system structures.
- Corporate status of railway companies.

In particular, Dr Sean Phillips, head of National Treasury's Operation Vulindlela unit, believes that the halving of container freight volumes on rail over the 10 years between 2010-2020 was not due to price elements but rather due to unreliable service offerings by South African freight operators such as Transnet which is no longer able to meet market demands. This is supported by Andiswa Maqutu in a 2015 article "Road is still king of freight" which indicates that rail is in fact 75% cheaper than road transport, but road is often preferred being a more reliable service.

Furthermore, a key component of the South African economy is mining and commodity exports, which are sustained through the country's rich natural resource and mineral reserves. Should commodity prices remain at the levels observed in 2021, mining companies will be incentivised to continue or even increase production at the higher profit margins which should sustain or grow freight volumes further.

A paper released in July 2019 by Zolile Toli of Transnet and Casandra Mara of the University of Johannesburg highlights the following as reasons for declining rail market share in South Africa:

- Lack of adequate management skills
- Inability to adapt to market demands

- Unfavourable economic conditions
- Aging infrastructure
- Operations are not customer-centric

Similar issues were identified in the Market Analysis and Benchmarking Report which provided an assessment of the three largest rail operators in the country, and which was completed earlier in the project. It is therefore important in a local context to consider whether the above issues are being resolved in order to understand the prospects of rail within South Africa. Given that the problems are more closely aligned with management of operators than with factors directly in the control of the RSR, it is difficult to predict how these will transpire over time. A positive development within the freight rail industry is that of third-party access whereby private operators will be allowed to use the rail infrastructure owned by Transnet. CEO of the African Rail Industry Association (ARIA), Mesela Nhlapo, believes that this development could provide a "multi-billion rand boost to the economy", notwithstanding the additional capacity which may improve the attractiveness of rail freight as it becomes more efficient and reliable. This would most likely result in a large increase in freight volumes traversing the national rail system.

An additional supporting argument for the sustained use of rail includes its energy efficiency relative to other modes of transport. The International Energy Agency released a report in November 2021 which indicates that although passenger rail accounts for 8% of motorised passenger movements and freight rail accounts for 9% of freight activity, rail only accounts for 3% of total transport energy use. As the world moves towards a greener future whereby more environmentally friendly solutions are being preferred to incumbent practices, rail will be an ideal candidate for both passenger and freight transport due to its energy efficiency and versatility.

Further to the above environmental argument, the COVID-19 pandemic has resulted in an opportunity for freight rail to claim market share from other transport modes that have been adversely impacted by restrictive transport regulations. Supply chains across the world have been disrupted with truck-driver shortages and various restrictions on air and sea travel. The post-pandemic landscape is one where the cost of truck, sea and air transportation costs have increased significantly relative to rail freight costs. This development may result in a shift towards rail as a preferred means of transport given its greater cost-efficiency.

The Organisation for Economic Co-operation and Development (OECD) website provides activity statistics for passenger and freight trains for various countries around the world. The statistics for passenger and freight activity are quoted in passenger kilometres and tonne kilometres respectively.

<u>CAGR over the period 2010-2019</u>

	Passenger kms	Tonne kms
Australia	2.0%	8.1%
China	5.9%	1.0%
India	2.5%	0.6%
Mexico	7.2%	1.4%
Russia	-0.4%	2.9%
Turkey	11.0%	2.8%

Observing the CAGR of these statistics for the other BRICS (Brazil, Russia, India, China, South Africa) countries as well as selected other countries over the period 2010-2019 (or earlier where recent data was not available), it is noted that both passenger and freight activity has been increasing (except for Russian passenger train activity) on average over the selected period, and may be an indication of future growth rates in passenger and freight rail use that can be expected from developing nations. In particular, China and Mexico show significantly increasing passenger rail activity over the period. Australia is an economy which has a large mining industry similar to South

Africa and was therefore also considered for reference. The large annual growth rate in tonne kms in Australia might suggest that mining industries supported by strong commodity prices may spur freight rail activity.

Data on Brazil was not available, while Turkey and Mexico were selected for observation being emerging-market economies that are often considered alongside South Africa in economic analysis. Although the rail industries may not be directly comparable, consideration of the growth and adoption of rail in the economy might be useful.

Adaptation to Model following Stakeholder Engagements

This section to the RSR Model-Build Report serves to highlight the changes that have been implemented to the Safety Permit Fee Model following internal deliberations, stakeholder engagements and demonstration sessions with operators held in February 2022.

The RSR Model-Build Report provided a detailed account of the mechanisms and logic underlying the Safety Permit Fee Model. High-level findings from preceding research and stakeholder engagements were included in the report to illustrate the processes followed before model construction was undertaken and how the associated learnings informed the various elements of the final model. All of the above elements remain relevant in the context of the Safety Permit Fee Model. Subsequent changes and their implications are described in the sections that follow and the reader may assume that any content from the RSR Model-Build Report remains relevant unless otherwise indicated.

In particular, the six scenarios outlined in the RSR Model-Build Report are still valuable in terms of understanding the impact of changing the different model parameters. The focus of the scenarios was intended to be on the changes in safety permit fees relative to the Base Scenario when certain parameters were adjusted, so that the effect of each parameter could be better understood. The specific fee output was of less importance given that this was dependent on activity data which was still being reviewed and finalised by the RSR.

The parameter configurations of two scenarios were suggested for use in the actual calculation of fees (once data had been finalised) based on what was deemed appropriate given the information available at the time of modelling. These suggestions have now been replaced with a new suggestion for the parameter configuration given the changes to the model as described in this addendum. The new configuration is provided in a section below. Indicative results from the model have not been included as these are still dependent on the finalisation of activity data which is currently underway. Furthermore, minor adjustments to the cost data have been introduced to align more closely with the cost structure (within the three cost buckets outlined in the model) of the RSR. A comparison between the latest model output and the output in the scenarios of the RSR Model-Build Report would therefore not be valid.

Once the activity data has been finalised and inputted into the model, changes to the suggested parameters may still be imposed should these produce more appropriate safety permit fee results and provide a more logical fit to the current railway landscape and industry.

The need to split distance and tons/passengers as activity measures

The South African railway industry is composed of different types of railway operators as determined by the nature of their operations and their responsibilities within the South African railways safety framework. Broadly, there are three operator types as per the Safety Permit Application guide for 2021-22:

Network Operator - the person or persons who have the ultimate accountability for one or more of the following:

- the safety of a network or part thereof including the proper design, construction, maintenance, and integrity of the network,
- ensuring compliance of rolling stock with the applicable standards of the network, or
- for the authorising and directing of the safe movement of rolling stock on the network

Train Operator - a person or persons who have the ultimate accountability for:

- the safe movement of rolling stock on a network,

- safety and integrity of rolling stock, and
- safety of freight or persons being conveyed

Station Operator – a person in control of a station, and the management of a station.

An operator may be classified as any combination of the above three types based on their operations. The Safety Permit Fee Model proposed the use of tonnage km's and passenger km's as proxies for activity given that these are standard measures of activity within the global transport industry and that they consider both distance as well as cargo/passengers being transported. However, operators that are of Network type only and Train type only would not report on both distances and tonnages moved given their operation type and where their responsibilities lie. As per the current system, a Network operator will report only the tonnages being moved on their network, while the Train operator that is moving goods on behalf of the network owner will report only distance. This introduces difficulty in using tonnage km's as an activity proxy as an operator that only reports on tonnages would not be able to report tonnage km's, and the same is true for an operator only reporting distances travelled.

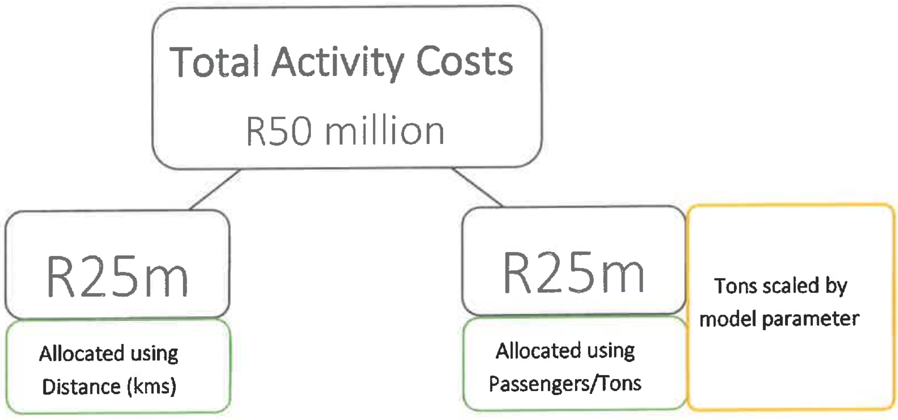
Furthermore, operators were previously not required to report on tonnage km's and passenger km's and so data on this was not readily available for use within the model. Requesting the data would require operators to set up systems to capture these metrics which by construction required recording of every trip's distance and tonnages/passengers. This was considered an onerous reporting task to accomplish in a short space of time and supported the use of an alternative activity metric which included information which was already being reported on by operators.

In order to appropriately measure activity across operators in the industry, both distance travelled, and tons/passengers would still have to be considered. The Safety Permit Fee Model has therefore been modified to intake activity values for each operator across the following areas:

- Distance (kms)
- Passengers
- Tons
- Dangerous goods tons

Each of the above should be inputted as annual figures. The model now considers number of passengers, number of tons and number of dangerous goods tons instead of passenger km and tonnage km for the reasons provided above. Exclusively Network operators would therefore report on the tons moved on their network while the Train operators performing this movement would report on the distance travelled, as has historically been the case. Both operators capture an activity measurement that represents the exposure to risk for each, while double counting of activity is avoided as the measures are distinct. An operator that is categorised as both Network and Train would report both tons and distance as they are solely available for the entire operation in that case.

To determine the activity component of the safety permit fees, the model splits the Activity costs in half. One half of the costs is allocated based on each operator's total distance travelled relative to other operators in the industry. The other half of the costs are allocated based on the number of passengers and number of tons transported by each operator relative to the industry total. The parameter in the model which specifies the number of passengers to tons will still be applied, but not to the distance part of the calculation. Therefore distance will be used as reported by both passenger and freight trains. Passengers and Tons reported will be scaled by the parameter so that appropriate comparison can be made between passenger and freight trains. An illustration of this process is provided below:



An explanation of the scaling parameter will be provided in the next section which describes the parameter selection for the model.

Parameter selection within the Safety Permit Fee Model

The key parameters that need to be set in the Safety Permit Fee Model include:

- Occurrence category severities – values which determine the weighting of each occurrence category in the calculation. Higher severities will carry greater weight and will therefore attract a greater share of costs.

- Passengers to General Freight tons relationship - an indication of the number of tons which equal one passenger from a calculation perspective. A greater value places greater weight on passengers and so passenger trains will attract a greater proportion of activity-related costs.

- Dangerous goods tons to General Freight tons relationship - an indication of the number of tons which equal one dangerous goods ton. A greater value places greater weight on dangerous goods tons and so dangerous goods trains will attract a greater proportion of activity-related costs relative to freight trains.

- Activity historic period - the historic period over which operator activity will be considered in the calculation.

- Occurrence historic period - the historic period over which operator safety records will be considered in the calculation.

As evident from the above, the parameters in the model have not changed. The only difference being that the Passengers to General Freight tons relationship now applies to number of passengers and number of tons as opposed to passenger km's and tonnage km's as was previously the case. Similarly, Dangerous Goods tons are being related to General Freight tons instead of tonnage km's, given the revised configuration of the model.

The Occurrence category severities have been set by the RSR based on the safety implications of each category. The Passengers to General Freight tons relationship has been set through consideration of the revenue derived from travelling one passenger km relative to the revenue derived from travelling one ton km. An investigation was conducted to determine an appropriate value for this parameter such that passenger trains and freight trains could be compared on an equitable financial basis. Equitability in this case is achieved if both passenger trains and freight trains derive the same net financial benefit from one unit of activity when considering revenue generated and costs incurred (through the Safety Permit Fee Model) for each unit of activity. For example, if a passenger train earns five times as much as a freight train for one passenger km compared to one ton km, then one passenger km should attract five times the cost relative to the cost that a freight train should pay for one ton km. If this was not the case, the benefits accrued by passenger trains from the use of the rail network would far outweigh their "cost" of using rail and an economic imbalance would emerge.

The analysis involved consideration of the revenue generated per passenger km travelled for Operator 149 over the financial years 2017/18, 2018/19 and 2019/2020 (being the latest years for which published financial information was available). This was compared to the revenue generated per tonne km for Operator 207 over the same period. These operators are two of the largest and most instrumental passenger and freight railways within South Africa respectively and represent the majority of freight and passenger movements. The analysis indicated that Operator 149 was able to achieve on average 14.75 times the amount of revenue per passenger km travelled (excluding fare evasions) relative to every ton km travelled by Operator 207.

The Passengers to General Freight tons parameter is therefore suggested to be set at 14.75 in order to achieve this economic neutrality described earlier. The Dangerous goods tons to General Freight tons parameter has been left at 1 indicating that no distinction in terms of economic outcome is made between dangerous goods and general freight. This may be changed in future if required.

An historic period of three years is suggested for both Activity and Occurrences data within the model. Given that only a single year of activity data is currently available, this will necessarily be restricted to one year at present. Several years of occurrence data is available and the most recent three years should therefore be used. Three years has been selected as it achieves a reasonable level of smoothing so that operators do not experience large changes in their safety permit fees for changes in activity levels or occurrences, while excluding data which is too old to be considered relevant within the model. The selection of three years also aligns with the validity period for most Safety Permits issued by the RSR.

A comparison between road and railway

The Safety Permit Fee Model determines a portion of an operator's fees based on their level of activity on the network. The greater an operator's activity on the network, the higher the activity based fee component will be relative to other operators in the industry. This mechanism has been contrasted to road transport where vehicle owners are required to pay an annual licensing fee which is not linked to their subsequent level of activity. It should be noted, however, that road users are subsequently charged toll fees which will accumulate each time a toll is passed and are therefore linked to activity. Below is a rough example of the possible increase in costs based on a road user in Gauteng under the E-tolling system:

Rough Calculation of Tolling fees relative to Car license cost

E-toll fee (Approx.)	R2
Number of gantries passed on round trip	2
Cost per trip (A)	**R4**
Working days per year (B)	251
Total additional cost per year (A x B)	**R1 004**

The additional cost from passing just one gantry on the way to work and one on the way back can result in a significant annual expense relative to an annual Car License Fee.

Furthermore, motorists pay a fuel levy each time they refuel which can be considered an activity based cost. More active motorists who require more regular refuels will contribute more greatly to the Road Accident Fund (RAF) which is then used to compensate motorists who are involved in accidents.

Conclusion

The New Safety Permit Fee Model addresses key shortcomings of the previous model and the proposed model of 2019. The model is risk-based and follows a logical calculation methodology of cost allocation to the most active and least safe operators. Within the new calculation framework the RSR is able to meet its financial needs to the extent that rail operators are able to afford the fees being charged to them over the longer term. The importance of cost-containment by the RSR is therefore imperative, but also dependent on the growth and safety performance of the rail industry. The financial health of both the RSR and the operators are mutually dependent and therefore both need to be considered in the calculation of safety permit fees.

Global trends indicate that rail has an important role to play in the drive towards a more environmentally friendly world economy. Given the energy-efficiency and cost-competitiveness of rail, the impending introduction of third-party usage of the national railway network and the buoyant local mining industry which was spurred by strong commodity prices in 2021, rail adoption in South Africa could be expected to increase in years to come. The extent of this adoption will depend on the reliability of rail operations and mismanagement thereof which were identified as major obstacles within the South African context. It is of utmost importance that the costs to be recovered are appropriate and affordably recoverable from the operators. This ensures the financial viability of both operators and of rail as a mode of transport, which in turn strengthens the financial sustainability of the RSR itself.