UIC SAFETY PLATFORM

UIC Safety Report 2025
Significant Accidents 2024

November 2025

INTERNATIONAL UNION
OF RAILWAYS

Table of Contents

List of Figures

Foreword

It is my pleasure to present this year's Safety Report, which reflects the continued dedication of our members and partners to enhancing railway safety across the globe. Each year, the data, analysis, and experiences shared through our network contribute to a stronger, safer, and more resilient railway system.

UIC is also pleased to welcome a new infrastructure manager to its Safety Database: BLS from Switzerland. This addition underscores UIC's commitment to broadening its reach and inviting companies worldwide to join this initiative – enhancing safety, promoting a harmonised safety taxonomy, and encouraging collaboration through cross-cutting initiatives.

This year also marks an important step forward in the joint work between the Safety and Sustainability departments, who jointly undertook a study on *Animals on Tracks*. Beyond safety, wildlife collisions have an operational and financial impact, including train delays, rolling stock damage, infrastructure repairs, and service disruptions. By integrating biodiversity considerations into railway operations and infrastructure design, operators can mitigate these impacts, protect ecosystems, and strengthen safety performance – underlining that railways are environmentally responsible and sustainable transport solutions.

I would like to thank all of the contributors, members, and partners for their commitment, expertise, and cooperation. Together, we are continuing to make rail transport safer and more sustainable for future generations.

François Davenne

UIC Director General

Executive Summary

This year's report analyses the trends in significant accidents and includes an ad hoc study on the presence of animals on the tracks as part of the thematic focus.

Regarding significant accidents, railway safety performance in 2024 presents a mixed picture, with a combination of improvements and persistent challenges. The number of significant accidents has shown a steady rise over the five-year period, increasing from 1,660 in 2020 to 2,018 in 2024. After peaking in 2022–2023, accidents involving human consequences declined in 2024. This suggests that although the overall number of accidents is rising, their severity in terms of human impact may be decreasing.

The Global Safety Index (GSI) showed a slight improvement in 2024, reflecting reduced severity and impact of reported accidents. The Relative Safety Index remained stable, indicating that safety performance is broadly consistent relative to operational volume. The accident rate per train-kilometre also remained unchanged, while both victims and fatalities per train-kilometre decreased in 2024. Together, these indicators point to a positive shift in accident severity, despite an increase in occurrences.

Level crossing accidents increased by 16% in 2024 compared with 2023, reversing the previous downward trend. This rise—particularly at active crossings—highlights the need for renewed investment in level-crossing safety, including public awareness initiatives, enforcement measures, and technology-based solutions. Total victims decreased by 3.9% in 2024, with fatalities falling by 13.2%, although serious injuries increased by 13.7%. This indicates that while fewer incidents are fatal, the number of non-fatal but serious injuries is growing. Staff casualties also remain a concern, with 33 fatalities and 58 serious injuries recorded in 2024.

The trends observed show that, although certain indicators have improved, continued vigilance and a sustained commitment to safety remain vital to ensure lasting progress, and some areas, such as level crossings, require particular ongoing attention.

For the complete report and more in-depth information, please use the provided links to access the full interactive digital version via Power BI.

UIC Safety Public Report

UIC Safety Report Focus 2025

Luca Maria Granieri, Chair of Safety Performance Group

1. Report on Significant Accidents 2020-2024

Glossary

Significant accident	Any accident involving at least one rail vehicle in motion, resulting in at least one person killed or seriously injured, or in significant damage to stock, track, other facilities, or the environment, or leading to extensive disruption to traffic. Accidents in workshops, warehouses, and depots are excluded. **Further in text mentions refer to this as an "accident".**
Level crossing	A level intersection between a road and a railway, as authorised by the infrastructure manager and open to public or private road users. Passages between platforms within stations are excluded, as well as passages over tracks for the sole use of employees. Also referred to as grade crossing.
Active level crossing	A level crossing where the crossing users are protected from or warned of the approaching train by devices activated when it is unsafe for the user to traverse the crossing. Protection by the use of physical devices includes: – half or full barriers; – gates. Warning by the use of fixed equipment at level crossings: – visible devices: lights; – audible devices: bells, horns, klaxons, etc.; – physical devices: e.g. vibration of road bumps.
Passive level crossing	A level crossing without any form of warning system or protection activated when it is unsafe for the user to traverse the crossing.

1.1 UIC Safety Database members and data availability in 2025

In 2025, 33 infrastructure managers[1] across Europe, Asia-Pacific and North America provided safety related data to the UIC Safety Database, with 20 of these companies also participating in additional data collection for the "*Focus study on Animals on T*racks" for the period from 2019 to 2024.

[1]Contributors in 2025: ADIF, AMTRAK, Bane NOR SF, BLS, Canada, CFL, CFR, CIE, DB AG, Euskotren, FGC, FTIA, HZ Infrastruktura, Infrabel, Infrakos, IP, LDZ, LTG, MAV, Network Rail, NRIC, ÖBB, OSE, PKP, ProRail, RAI, RFI, SNCF Réseau, SZ(CZ), SZ(SI), TCDD, Trafikverket, ŽSR.

Figure 1: UIC Safety Report contributors 2025

1.2 Evolution of significant accidents

This report focuses on the five-year period from 2020 to 2024, based on data of significant accidents provided by the 30 railway companies[2] that contributed consistently throughout the entire timeframe. For the sake of coherence and comparability, only these continuous contributors are included in the analysis.

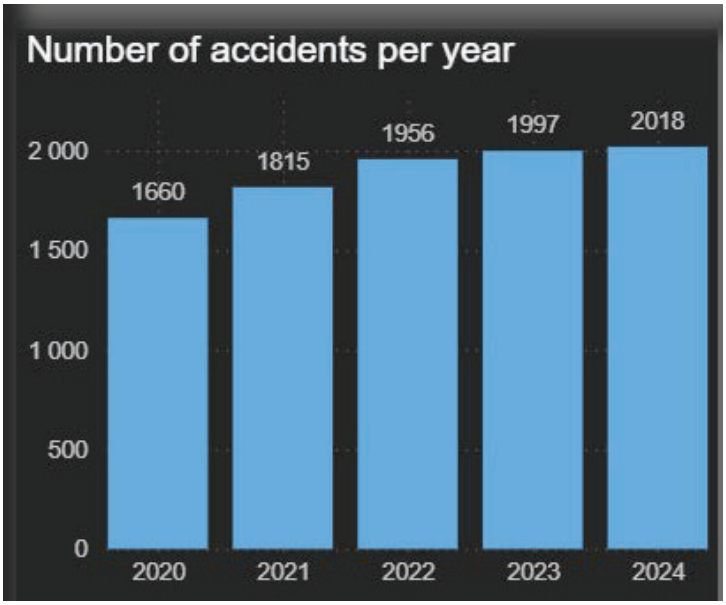

Figure 2: Number of significant accidents

[2]Contributors from 2020-2024: ADIF, AMTRAK, Bane NOR SF, Canada, CFL, CFR, CIE, DB AG, Euskotren, FGC, FTIA, HZ Infrastruktura, Infrabel, IP, LTG, MAV, Network Rail, NRIC, ÖBB, OSE, OKO, ProRail, RAI, RFI, SNCF Réseau, SZ(CZ), SZ(SI), TCDD, Trafikverket, ŽSR.

The graph shows a steady increase in the number of accidents per year from 2020 to 2024. In 2020, there were 1660 accidents, rising each year, up to a total of 2018 in 2024. Overall, this represents a 21.5% increase over the five-year period, indicating a consistent upward trend in accidents.

1.3 Accidents with human consequences

The graph shows that from 2020 to 2024, total accidents and accidents with human consequences steadily increased until 2023, and then declined slightly, reaching 1812 and 1386 respectively in 2024. Victims also rose until 2022, with 1706, but then slightly declined. Overall, while accidents have generally continued to increase, the number of victims stabilised or decreased slightly after 2022. Despite this slight decline, complacency would be premature, continued vigilance is essential.

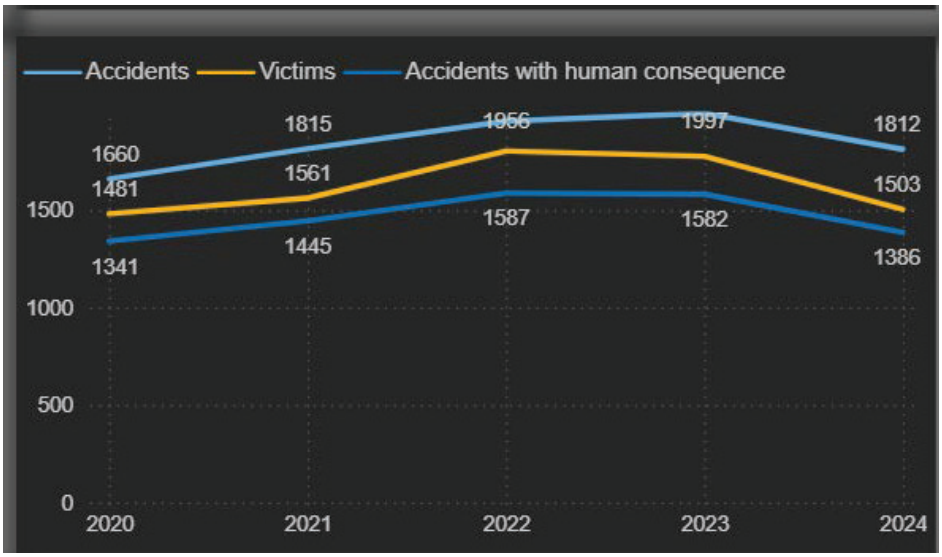

Figure 3: Accidents, victims, and accidents with human consequences

1.4 UIC Global Safety Index

The Global Safety Index (GSI) is a composite indicator factoring in accident severity, victim count, and railway responsibility. The UIC Global Safety Index is a weighted measure of accidents, where passenger and staff victims, as well as internal causes, carry greater weight than trespasser victims and external causes. Additionally, accidents with a higher number of victims are weighted more heavily than those with fewer victims

It is calculated using a following formula: **GSI = Σ ((Cv x Cn) + Ca) x Cr**

where :

→ **Cv** is the coefficient for the category of victim, from 1 (a serious trespasser injury) to 8 (a passenger fatality);

→ **Cn** is the coefficient for the number of victims, from 0 (no victim) to 5 (more than 5 victi ms);

→ **Ca** is the coefficient for the type of accident, from 1 (a person hit by a train) to 7 (a dera ilment or a collision between trains;

→ **Cr** is the coefficient for the railway system responsibility, from 1 (external causes) to 2 (internal causes).

The graph shows a slight improvement in both the Global and Relative Safety Indexes from 2022 to 2024. This minor improvement is mainly due to there being fewer victims and consequently less severe accidents, while the slight increase in train-kilometres likely had a negligible impact on overall safety performance.

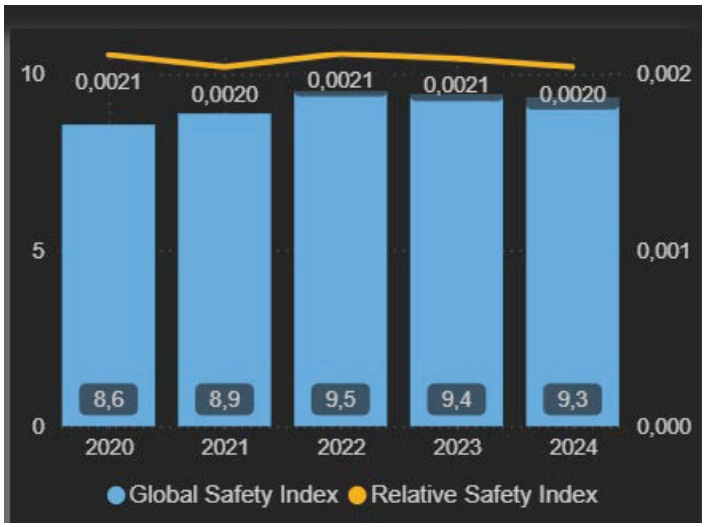

Figure 4:Global Safety Index and Relative Safety Index

1.5 Normalised safety indicators (per train-kilometre)

While the accident rate per train-kilometre remained relatively stable, the rate of victims and fatalities per train-kilometre rose. Victims/train-km showed an improvement with a reduction from 0.39 in 2023 to 0.37 in 2024. Moreover, fatalities/train-km dropped more significantly, from 0.26 in 2023 to 0.22 in 2024, the lowest in the five-year period.

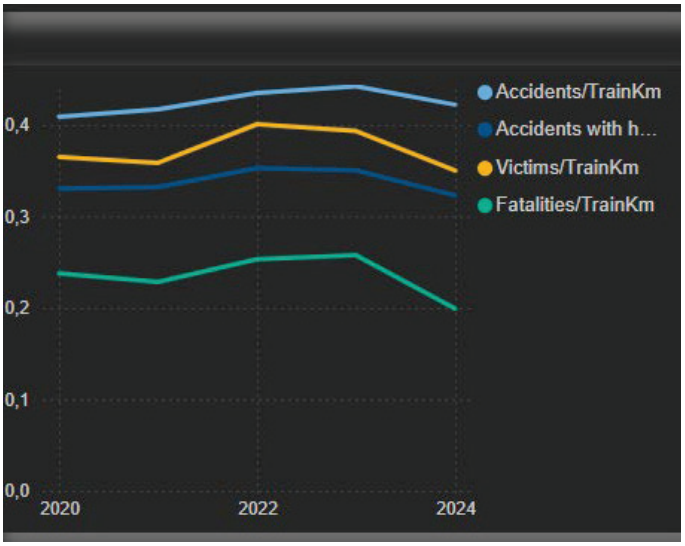

Figure 5:Normalised safety indicators per train-kilometre

1.6 Level crossing accidents

Level crossing accidents increased by approximately 16% in 2024 compared to 2023. This marks a notable rise after two years of decline. The increase is seen in both active crossings (from 264 to 313) and passive crossings (from 125 to 144). This suggests a renewed need to strengthen safety measures at level crossings, particularly at active sites, which account for the majority of incidents.

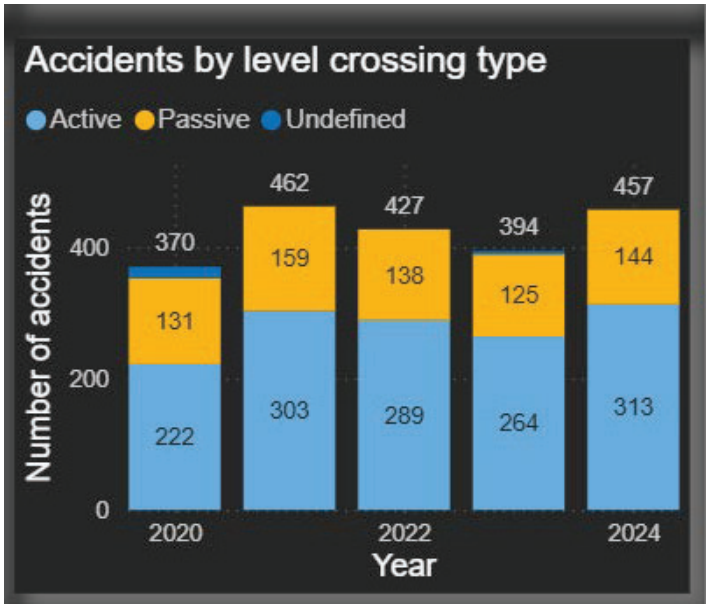

Figure 6: Accidents at level crossings

1.7 Victim statistics

The total number of victims decreased by 3.9%, from 1776 in 2023 to 1706 in 2024. Fatalities saw a significant drop of 13.2%, indicating a positive shift in the severity of outcomes. In contrast, serious injuries increased by 13.7%, suggesting that while fewer incidents were fatal, more resulted in non-fatal harm. Despite these fluctuations, safety remains a concern and must continue to be addressed through targeted prevention and mitigation efforts.

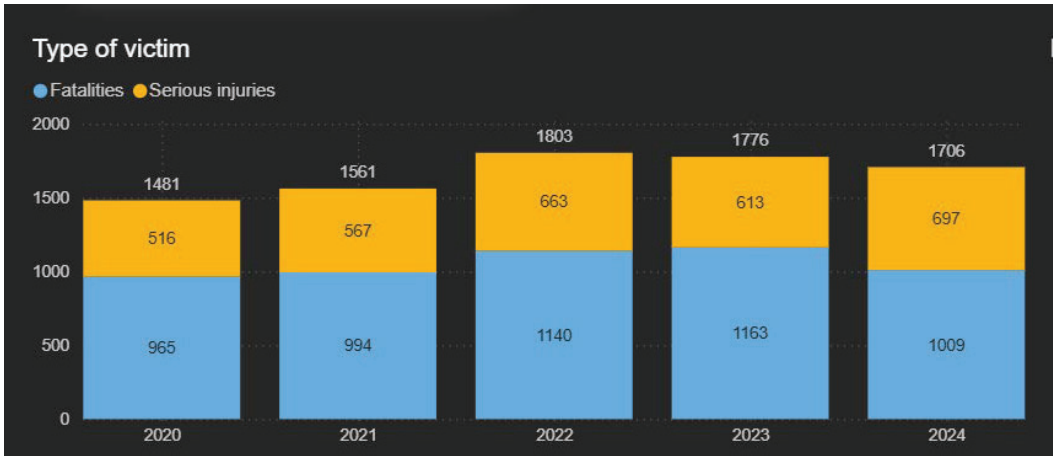

Figure 7: Number of victims: fatalities and serious injuries

In 2024, a total of 33 fatalities and 58 serious injuries were recorded among railway staff and contractors, amounting to 91 staff victims. While staff casualties represent a relatively small share of total victims – 3% for fatalities and 8% for serious injuries in 2024 – these figures have remained consistent over recent years. This indicates that, despite their lower proportion, the causes still need to be addressed.

1.8 Accidents with consequences on traffic

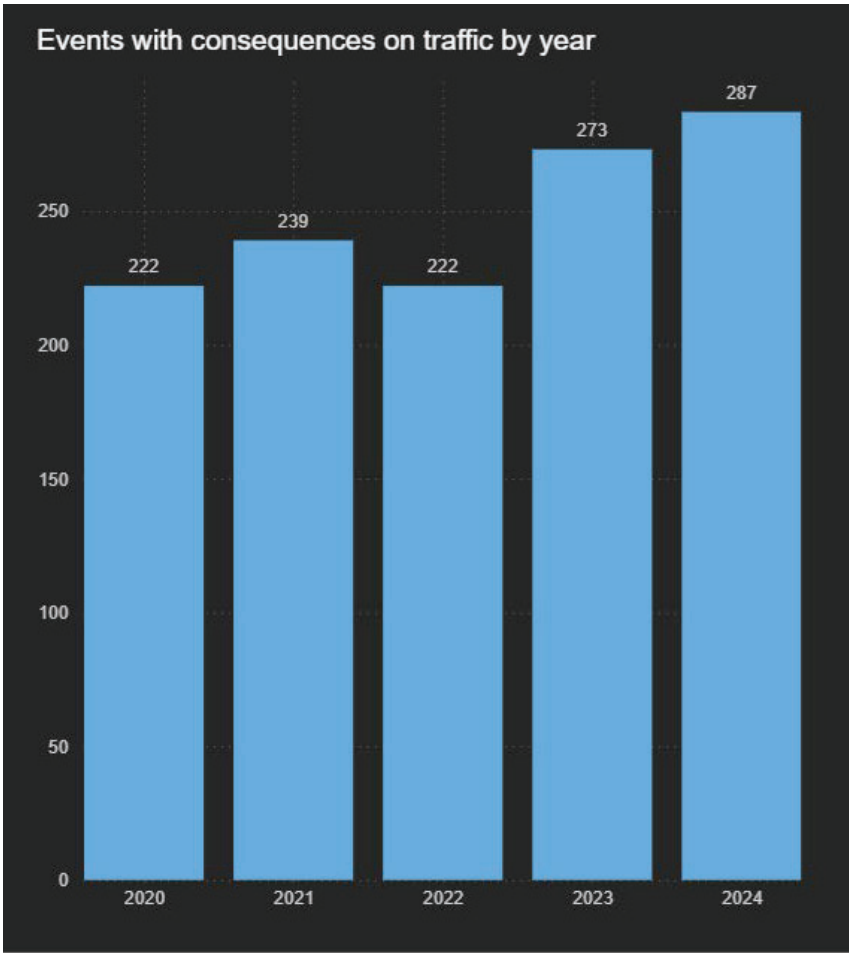

Figure 8: Number of victims: fatalities and serious injuries

The number of events with consequences on traffic has increased steadily over the past two years, rising from 222 in 2022 to 287 in 2024. This 29% increase highlights a growing operational burden, even in the absence of a severe impact on safety. These disruptions may stem from animal collisions, infrastructure issues, or other external factors, and they underline the need for resilience planning, incident response efficiency, and preventive measures to reduce service interruptions.

2. FOCUS: Animals on Tracks

Glossary

Accident	A case where a train strikes an animal (for the purposes of section 2 of this document)
Incident	A case where an animal is observed on or near the track without a collision
Event	Refers to both accidents and incidents in this study

Consequences	The outcome(s) of an event, as reported by the railway infrastructure manager. Possible consequences include delays, train damage, derailment, or infrastructure damage
Daylight	The period between sunrise and sunset
Twilight	The one hour before average sunrise and the one hour after sunset
Nighttime	All remaining hours outside daylight and twilight
Domestic animals	Farm animals and pets

Recent trends in international and regional regulatory frameworks increasingly link railway safety with environmental protection and biodiversity conservation. As part of this, the OECD is encouraging infrastructure projects to integrate ecosystem safeguards and reduce habitat fragmentation through risk-based environmental management systems. Within the European Union (EU), the Habitats Directive (92/43/EEC), Birds Directive (2009/147/EC), and the EU Biodiversity Strategy for 2030 impose legal obligations on transport operators to avoid or mitigate impacts on protected species and ecological networks.

Railway operators in the EU are legally obliged to implement environmental risk assessments, mitigation measures, and monitoring systems. Wildlife encounters can also have significant operational and financial consequences, including service delays, rolling stock and infrastructure damage, and disruptions to passenger and freight timetables. Current frameworks emphasise the need for harmonised risk assessments, standardised reporting, and collaboration with environmental specialists. Effective strategies include wildlife crossings, trackside vegetation management, monitoring programmes, and targeted mitigation measures.

This report focus analyses railway safety and wildlife interactions (from 2019 to 2024), providing insights on operational risks, impacts on biodiversity, and mitigation strategies. It supports evidence-based decision-making for infrastructure managers, railway undertakings, regulators, and sustainability stakeholders.

The data is only representative of the UIC members who submitted information and not necessarily the full membership. Nevertheless, coverage is growing annually as participation and reporting improve. The findings may indicate certain trends but should not be considered applicable to all networks. The target audience is mainly safety and sustainability professionals working for railway infrastructure managers and undertakings. It may also help academics and researchers interested in data-driven analysis of railway-wildlife interactions and sustainable transport solutions.

The interaction between rail operations and wildlife represents a critical concern for both operational safety and environmental stewardship. Encounters with wild or domestic animals can result in operational service disruptions, rolling stock and infrastructure

damage, and negative impacts on biodiversity as well as potential consequences in terms of safety. As the rail sector continues to position itself as a sustainable transport solution, fostering a harmonious coexistence between railway activities and natural ecosystems is becoming increasingly imperative.

2.1. Scope and methodology

This year's focus study examines animal presence on railway infrastructure, encompassing both wildlife sightings and collision events with animals. The analysis incorporates:

- Temporal patterns (seasonal variations, weekly trends, and lighting conditions)
- Characteristics of the infrastructure where the incident took place
- Species-specific analysis
- Operational consequences of these encounters

UIC extends its sincere thanks to twenty railway networks who contributed data to this comprehensive UIC study. While some challenges with data heterogeneity and incomplete reporting across certain criteria were encountered, the information received remains invaluable.

Despite these limitations, the study provides an initial assessment of the scope and nature of this challenge. The presence of animals on tracks is a universal reality across all railway networks and warrants a response that balances operational concerns with environmental responsibility.

In this regard, the UIC Alliance for Connecting Railways & Restoring Nature (ACORN) project represents a crucial initiative in this domain, addressing wildlife-rail interactions through a systematic approach that includes:

- Developing harmonised guidelines for animal incident management
- Implementing standardised key performance indicators (KPIs) and performance monitoring frameworks
- Identifying and sharing best practices through capacity-building activities and expert consultation

2.2. Trend analysis: an improving trajectory

Data from eleven networks that contributed consistently throughout the study period demonstrates a clear improvement (Figure 9). This decline is evident both in terms of the absolute number of incidents and accidents, as well as the normalised rate per train-kilometre.

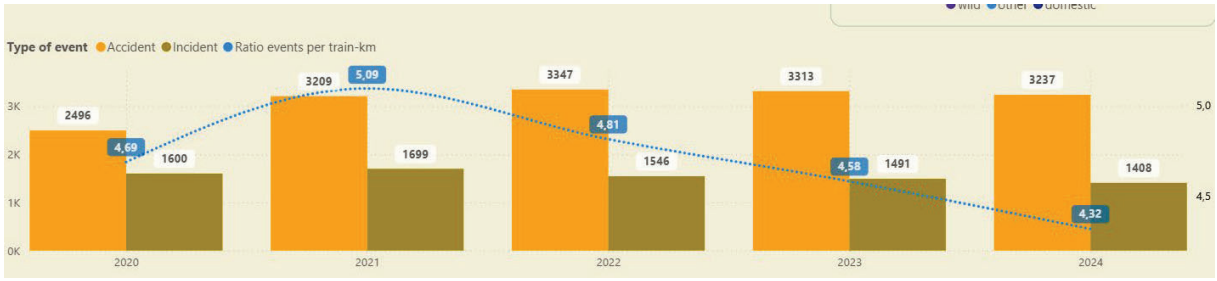

Figure 9: Annual number of events and event rate per train-kilometre (2020–2024)

The graph illustrates this positive progression, showing a consistent reduction in wildlife-related events from 2021 to 2024, with the ratio of events per train-kilometre decreasing from 5.09 to 4.32 in this period. This improvement suggests that mitigation measures implemented by these networks may be yielding positive results.

2.3. Temporal patterns

Temporal analysis reveals pronounced seasonal variations in wildlife-rail interactions, dependant on the light conditions, day of the week, or hour in the day.

As displayed in Figure 10, the winter months (Dec, Jan, Feb) have the highest frequency, driven by increased reports of both accidents and incidents. The share of incidents within winter totals is roughly in the 21-26% range, similar to other patterns, indicating that the season dramatically affects both accident and incident counts rather than shifting the mix.

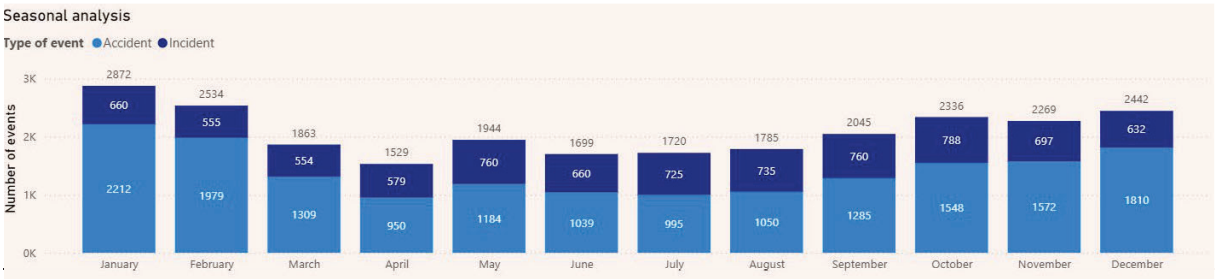

Figure 10: Monthly distribution of events

The heatmap (Figure 11) shows that peak wildlife-related occurrences are concentrated during weekday daytime and evening hours, with the highest activity observed between 17:00 and 22:00.

Number of events per hour and day of the week

Weekday	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	118	71	68	68	112	164	193	216	188	148	136	109	137	150	120	126	140	177	225	250	262	283	184	149
Tuesday	106	87	66	71	116	162	197	219	185	158	133	111	153	151	140	126	144	174	225	236	253	237	210	153
Wednesday	102	101	83	60	117	154	204	211	192	158	182	133	125	135	129	122	149	191	233	220	234	222	175	144
Thursday	107	71	65	87	112	184	170	210	189	159	125	151	105	123	139	128	143	190	218	226	279	277	198	124
Friday	83	89	67	58	119	166	190	221	174	166	142	138	132	128	117	147	156	207	219	261	236	261	182	118
Saturday	87	76	53	67	87	115	144	156	155	124	135	118	91	110	132	124	154	143	178	205	208	228	172	96
Sunday	60	53	33	36	42	75	90	125	123	151	117	118	81	99	125	129	116	168	208	208	221	229	182	151

Figure 11: Number of events per hour and day of the week

2.4. Consequences of animal encounters and the impact on safety

Encounters with animals affect railways at multiple different levels. They impact the passenger experience through delays, raise costs from damage to rolling stock and infrastructure, and contribute to safety risks such as derailments, with broader implications for biodiversity on railway land.

Delays are the principal consequence, accounting for about 58% of declared issues. Train damages represent about 41% of declared consequences, making it the second-most frequent outcome.

Derailments remain rare, with only four cases reported over five years among 20 contributors. However, three of these four were caused by collisions with cows, supporting the assumption that large-boned animals are more likely to lead to severe consequences.

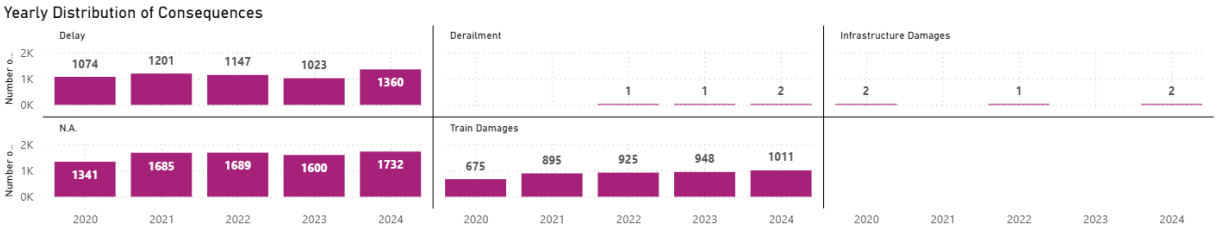

Figure 12: Yearly distribution of consequences

Despite harmonisation efforts, roughly half of the declared events do not specify the species involved. Therefore, improving species identification and data completeness is essential to better understanding the biodiversity and safety implications of animal–railway interactions.

2.5. Species-specific analysis

The focus study incorporates an advanced “drill-through” functionality that provides detailed species-specific analysis, given here with a comprehensive example using data on deer (Roe, Fallow, Red, and Reindeer). This interactive dashboard presents a multidimensional view of wildlife-rail interactions with 6,063 documented deer encounters (Figure 13).

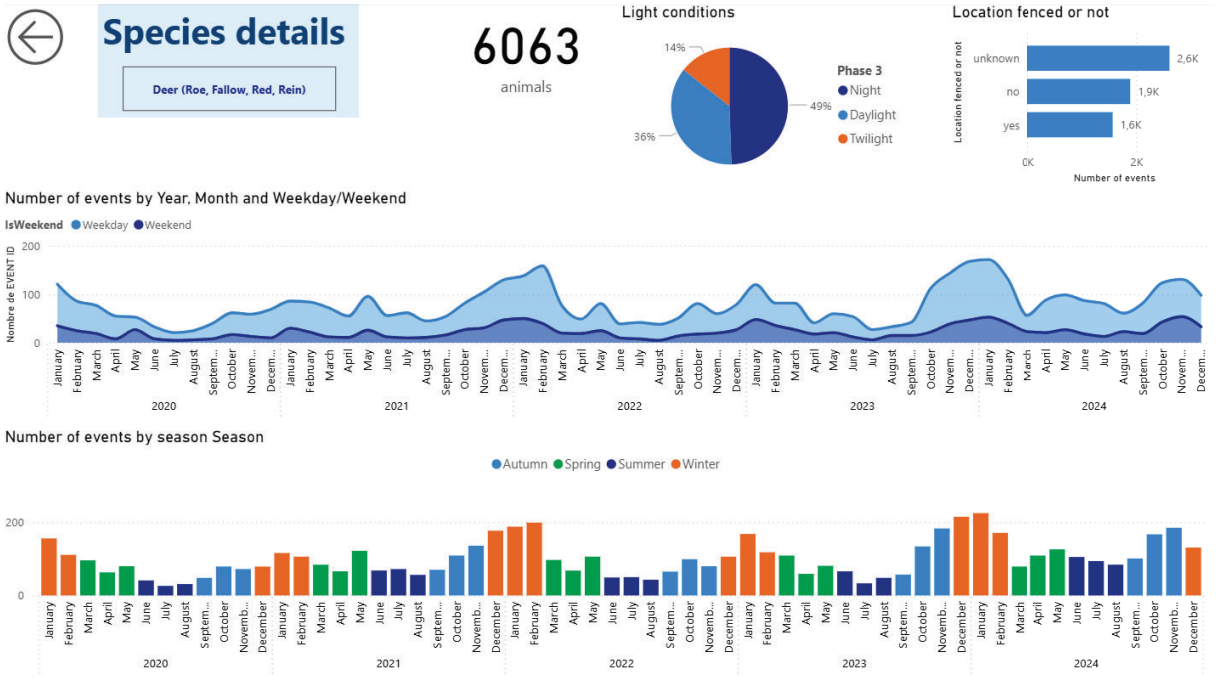

Figure 13: Drill-Through Dashboard – species-specific analysis

Light condition distribution reveals that nearly half (49%) of deer encounters occur during nighttime hours, with 36% in daylight and 14% during twilight periods.

Infrastructure assessment uncovers event distribution across fenced (1.6K events), unfenced (1.9K events), and undocumented (2.6K events) locations.

Longitudinal analysis (2020-2024) shows monthly encounter frequencies with a clear differentiation between weekday (light blue) and weekend (dark blue) patterns.

Seasonal fluctuations are precisely mapped, revealing notable autumn and winter peaks, particularly evident in November-January periods across multiple years, potentially also reflecting seasonal animal migration between different habitats.

This species-specific dashboard enables railway operators to develop targeted mitigation strategies based on the unique behavioural patterns of each species. For deer

specifically, the data suggests focused interventions during night hours, and autumn/winter months would yield the greatest improvements to safety.

The interactive nature of this analysis allows stakeholders to examine similar detailed profiles for other frequently encountered species, creating a comprehensive knowledge base for wildlife management along railway corridors.

2.6. Conclusion: Towards harmonised wildlife management on railways

This study of wildlife-rail interactions reveals clear temporal and spatial patterns that can inform targeted mitigation strategies. The data demonstrates distinct species-specific behaviours, seasonal variations, and infrastructure vulnerabilities that collectively contribute to animal encounters on railway networks.

The findings underscore the need for a coordinated, evidence-based approach to wildlife management across railway systems. While individual networks have implemented various mitigation measures, the heterogeneity in data collection and reporting highlights the necessity for standardised methodologies.

Starting in 2026, the UIC ACORN project will directly address these challenges through a systematic framework that will transform how the rail sector manages wildlife interactions. This initiative focuses on:

- Developing harmonised guidelines for animal incident management that can be implemented across various railway environments
- Establishing a catalogue of mitigation measures for effective, safe, and biodiversity friendly solutions to avoid train-wildlife collisions
- Establishing standardised KPIs and monitoring frameworks to enable meaningful cross-network comparisons and trend analysis
- Identifying and disseminating best practices through collaborative capacity-building activities and expert consultation

By participating in the UIC ACORN project, railway undertakings and infrastructure managers can contribute to and benefit from this collective expertise, ultimately enhancing both operational safety and biodiversity conservation. The insights gained from this focus study provide a valuable foundation for UIC ACORN's work, demonstrating the power of data-driven approaches to address this complex challenge.

As railways continue to position themselves as sustainable transport solutions, effective wildlife management represents not only an operational necessity but an environmental responsibility – one that the sector is increasingly prepared to meet through collaborative initiatives like the UIC ACORN project.

Authors & Acknowledgments

UIC thanks all of the members and partners for their contribution to this Safety Report.

A special thank you goes to the Safety Platform, Safety Database (SDB) community, and the UIC Sustainability Department for their collaboration, expertise, and co-authorship.

This report reflects the shared commitment of the UIC community to safer and more sustainable railways.

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