

Level Crossing Occurrences in Argentina and Proactive Actions

Studies area of the JST
National Directorate of Railway
Investigations.

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Abstract

The Studies area of the JST National Directorate of Railway Investigations (DNISF) develops statistics based on information obtained from various sources. In 2020, the area created its own database, called the Interactive Statistical Occurrences System (SEIS), in which occurrences are recorded in real time through a complex set of formulas¹ that result in yellow or orange alerts depending on the type of risk.

This article presents the updated statistics of the occurrences recorded at railway and pedestrian-rail crossings. It also describes the main actions taken to prevent accidents and incidents at the critical points of the system.

According to the Interactive Statistical Occurrences System data of the Transportation Safety Board (JST), 750 railway occurrences were recorded in 2022, of which more than 50% occurred at level crossings (LC).

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Based on the information provided by the system, an increase in occurrences at level crossings has

been observed in recent years. The interaction points within the land transportation system represent high safety risks, which is why their study is part of the JST Permanent Observation Topics (TOP).

This article presents the updated statistics of occurrences recorded at railway and pedestrian-rail crossings. Additionally, it describes the main actions taken to prevent accidents and incidents at these critical points in the system.

Occurrences Recorded in 2022

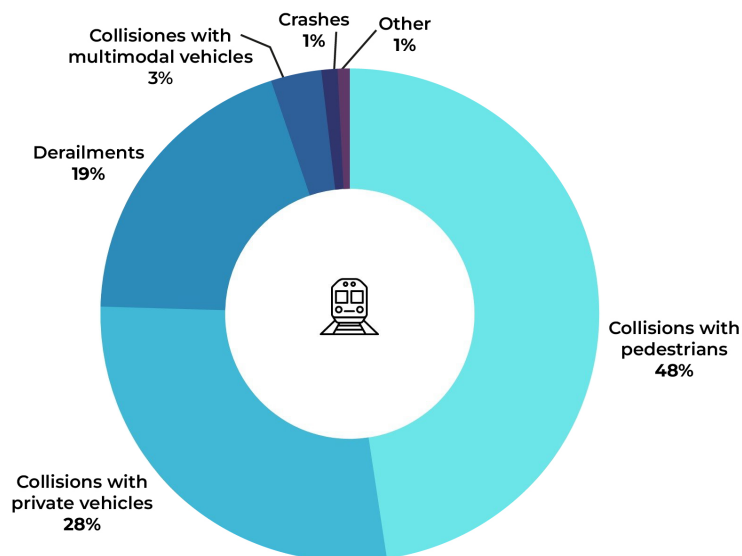
In 2022, 750 railway occurrences were recorded, of which 47% were train collisions with pedestrians, and 28%, collisions with private vehicles.

Table 1. Railway occurrences recorded in 2022

Occurrences (2022)	Amount	Percentage
Collisions with pedestrians	353	47 %
Collisions with private vehicles	211	28 %
Derailments	145	19 %
Collisions with multimodal vehicles	27	4 %
Crashes	8	1 %
Other	6	1 %
Total	750	100 %

Source: SEIS, 2022.

Chart 1. Total railway occurrences recorded in 2022²



Source: SEIS, 2022.

1. The data matrix includes date, year, time, description of location, type of event, mileage, branch, province, line, operating company, date of notification to the JST, type of source, among other variables.
 2. The category 'other' refers to third rail fires, obstruction, etc.

Level Crossing Occurrences

If occurrences are analyzed by type of location, 55% occurred at level crossings (Table 2 and Chart 2). Regarding occurrences at LCs, collisions with vehicles (private and commercial) and collisions with pedestrians can be differentiated (Table 3 and Chart 3).

Table 2. Occurrences by type of location

Occurrences by type of location	Amount	Percentage
Railway crossings (RC) + pedestrian-rail crossings (PRC)	409	55 %
Railway stations	218	29 %
Track area	96	12 %
Turnouts (T)	27	4 %
Total	750	100 %

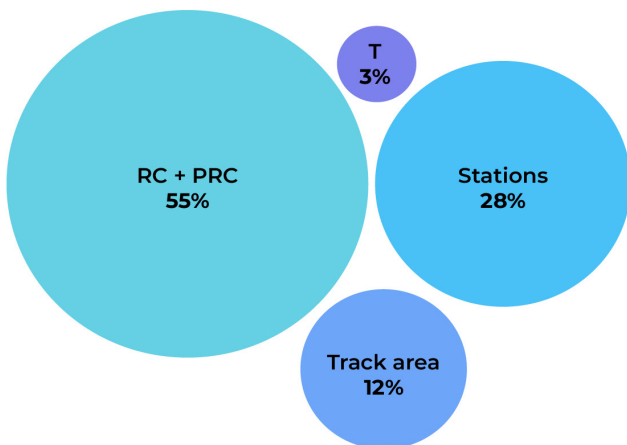
Source: SEIS, 2022.

Table 3. Collisions with vehicles and pedestrians at level crossings

Occurrences at level crossings by type of collision	Amount	Percentage
Collision with vehicles	171	42 %
Collision with pedestrians	238	58 %
Total	409	100 %

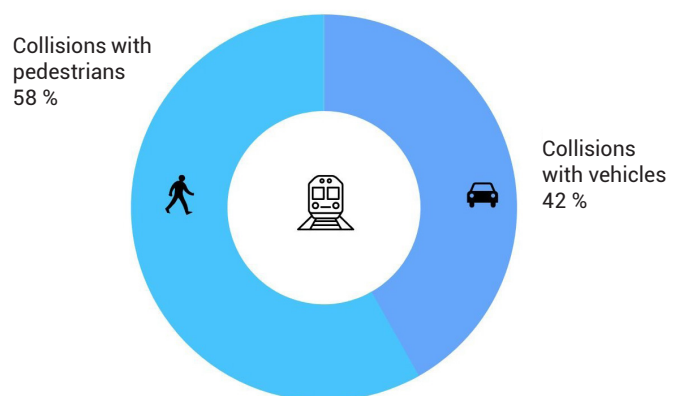
Source: SEIS, 2022.

Chart 2. Occurrences by type of location

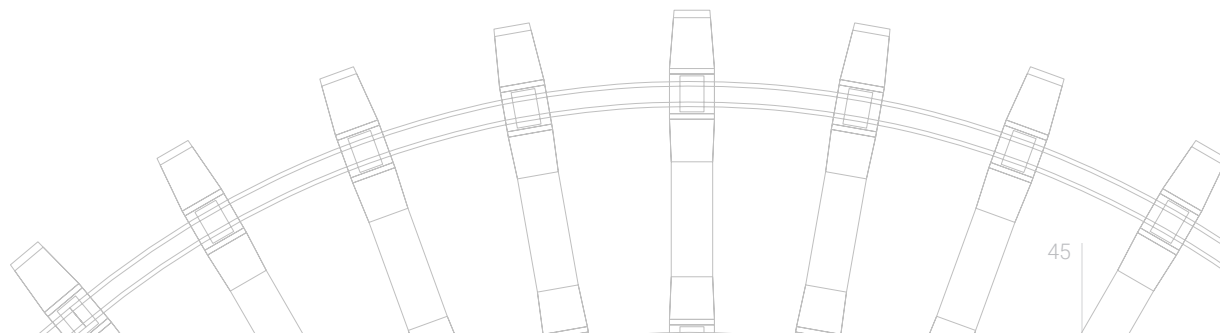


Source: SEIS, 2022.

Chart 3. Collisions with vehicles and pedestrians at level crossings



Source: SEIS, 2022.



Damage and Injuries to People³

In the case of collisions with vehicles, the majority of accidents resulted in serious injuries (52%).

Table 4. Collisions with vehicles by type of injury

Collisions with vehicles by type of injury	Amount	Percentage
Minor injuries	44	26 %
Serious injuries	90	52 %
Fatal injuries	37	22 %
Total	171	100 %

Source: SEIS, 2022.

Despite the nature of the type of accident, the majority of collisions with pedestrians at LCs resulted in minor injuries (62%).

Table 5. Collisions with pedestrians by type of injury

Collisions with pedestrians by type of injury	Amount	Percentage
Minor injuries	148	62 %
Serious injuries	57	24 %
Fatal injuries	33	14 %
Total	192	100 %

Source: SEIS, 2022.

Geographic Distribution of Collisions with Pedestrians

When examining the geographic distribution of collisions with pedestrians and vehicles at LCs, it should be noted that the AMBA⁴ region provides the most relevant data, as it covers an area of approximately 3,833 km² and concentrates 35% of the national population.

In this region, a significant number of interferences occur between passenger and freight railway lines and the network of vehicular and pedestrian traffic, especially in the Autonomous City of Buenos Aires (CABA), which is the geographical point from where the main railway stations were established, extending in a fan shape to different regions of the national territory.

Table 6. Collisions with pedestrians by geographical region

Collision with pedestrians by geographical región	Amount	Percentage
AMBA	134	56 %
Center	73	31 %
North-West	12	5 %
North-East	9	4 %
Patagonia	7	3 %
Cuyo	3	1 %
Total	238	100 %

Source: SEIS, 2022.

3. Data on injuries and fatalities are from reports submitted by the operating companies reports submitted by the operating companies. The final numbers may not coincide with the actual number of people affected.
 4. The Metropolitan Area of Buenos Aires (AMBA) is made up of the districts of the the districts of the City of Buenos Aires and the Province of Buenos Aires, including forty municipalities.

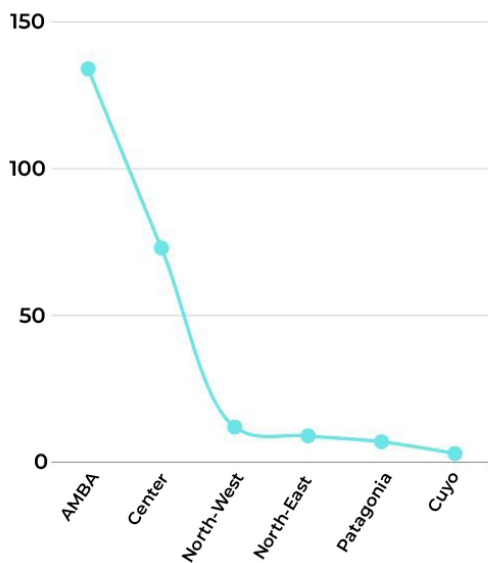


Table 7. Colisiones con vehículos por región geográfica

Collision with vehicles by geographic region	Amount	Percentage
AMBA	159	93 %
Centro	11	6 %
Noroeste	1	1 %
Total	171	100 %

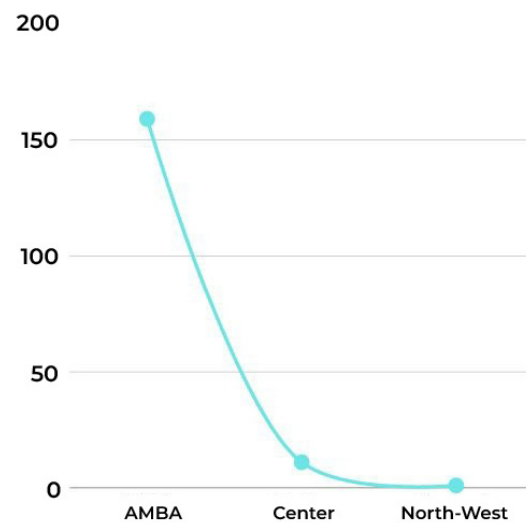
Source: SEIS, 2022.

Chart 4. Collisions with pedestrians by geographical region



Source: SEIS, 2022.

Chart 5. Collisions with vehicles by geographical region



Source: SEIS, 2022.

Proactive Actions

The DNISF developed the study "Comprehensive Approach to Level Crossings" in 2022, where risks at railway and pedestrian-rail crossings were analyzed, and proactive actions were proposed.

It is worth noting that the study had an interdisciplinary approach and included specialists from the railway and road sectors. Additionally, during the investigation process, a collaborative network was created among railway service operating companies, unions, railway health organizations, civil society organizations, and the National Transportation Regulation Commission (CNRT). This network fostered proactive actions aimed at raising awareness about safe crossing at LCs and minimizing safety risks.

The most relevant results of the study were presented at the XIV Congress of the International Level Crossing Awareness Day (ILCAD), an event organized by the International Union of Railways, where various stakeholders in the international railway transportation system participated. The JST presented the main

issues regarding LCs in the Argentine railway system and the proactive actions developed by the agency in collaboration with the multisectoral network.

Throughout the year, different actions with local impact were also developed, which are described below:

Awareness campaign at various LCs

In the framework of the International Level Crossing Awareness Day, celebrated on June 7 each year, the JST held an awareness campaign alongside civil actors from the collaborative network, such as the Suicide Assistance Center, Healthy Scenarios, and the Santa María Spiritual Center. The activities took place at three strategic locations in the Province of Buenos Aires: Del Tejar level crossing in La Matanza, 25 de Mayo level crossing in Merlo, and Güemes level crossing in Ramos Mejía. During the campaign, JST technical staff distributed graphic materials to pedestrians and vehicle drivers with information about the concern.

Enactment of Law 15387 'Railway Level Crossing Awareness Week'

On October 27, 2022, the legislature of the Province of Buenos Aires enacted Law 15387, which declared the second week of June each year as the "Railway Level Crossing Awareness Week," in line with the International Level Crossing Awareness Day. The project was presented by Deputy Dr. Alberto Conocchiari and was based on the data and statistical analysis from the JST study "Comprehensive Approach to Level Crossings."

Training at Schools

The organization conducted training sessions and rail accident prevention campaigns in educational institutions near railway stations and along track areas where urban passenger trains and freight trains operate.

Participation in 46° International Book Fair 2022

The JST participated in the 46th International Book Fair held in Buenos Aires. As part of activities aimed at children, agents from the railway studies area conducted a creative writing workshop under the slogan "We Move and Take Care of Ourselves," to raise awareness about transportation safety, environmental care, and the well-being of individuals.



Participation in Awareness Campaign Conducted by Operating Company Ferro Expreso Pampeano SA

Agents from the organization also participated in an awareness day focused on safe crossings at level crossings, held in the city of Trenque Lauquen, Province of Buenos Aires. The initiative was organized by the operating company Ferro Expreso Pampeano SA (FEPSA).

Studies and Safety Recommendations

Between 2021 and 2023, eight Safety Recommendations (SRs) were issued as a result of various Safety Studies (SSs) conducted by the DNISF.

SS: Collisions with vehicles at level crossing in Granaderos Street. The SRs were addressed to the company SOFSE:

- To install lane dividers within the Granaderos level crossing to prevent drivers from encroaching into the opposite lane.
- To adjust the barrier timings according to its original design based on train circulation.
- To comply with SETOP Resolution No. 7/81, modified by Decree No. 779/95, Annex L, signal R.30: "Railway Barriers."
- To improve the condition of the pedestrian crossing to prevent injuries to users.

SS: Analysis on level crossing of National Route 7, km 428, Rufino, Santa Fe (EX-2023-02030044- -APN-JS-T#MTR, DNISF, 2023). The SRs were addressed to the National Road Authority:

- To fulfill the SETOP Resolution No. 7/81, as stipulated in the supplement "Passive Signaling. Modifications in accordance with Decree No. 779/95, regulatory of Traffic and Road Safety Law No. 24449," regarding the passive signaling required at rural level crossings, specifically concerning horizontal signaling.
- To adjust the intersection signals according to the provisions established in the DNV Vertical Signaling Manual (2017).
- To implement auxiliary lines for speed reduction (H.7.) regarding Optical-Sound Bands, as recommended in point IV.5 of the DNV Horizontal Signaling Manual (2012).
- To provide the installation of active signaling at the level crossing on National Route 7, as stipulated in Resolution SETOP No. 7/81, point 8.7.2.4.

Link to the Operational Security Study:



Currently, the directorate is working on the following studies related to level crossings:

Table 8. Safety studies about level crossing accidents

SS Title	Description
Cintra level crossings	It arose from an orange alert issued by the SEIS, due to the recurrence of level crossing occurrences in the town of Cintra, Córdoba. Various occurrences were analyzed, and the crossing-associated risks were identified. Collaboration with local authorities was established to raise awareness among the local population.
Suicide prevention	The study focuses on analyzing various methods for suicide prevention in railway operational areas, particularly at level crossings.
AMBA two-way level crossings	It arose from an alert issued by the SEIS, due to the recurrence of two-way rail-pedestrian level crossings occurrences in the AMBA region.
Libertad level crossing	It arose from an alert issued by the SEIS, due to the recurrence of Libertad level crossing occurrences in the town of Merlo, Province of Buenos Aires.

Source: DNISF, 2023.

As noted thus far, the analysis of the issues and the awareness campaign regarding the dangers faced by users at level crossings are fundamental JST

objectives. In the future, it is planned to expand the collaborative network for the implementation of a national risk management system.



What do the signals at Level Crossings tell us?



Firstly, the signals indicate that we are approaching a level crossing (LC) or railway crossing. Additionally, we can identify their characteristics, the allowed speed, the distance to the crossing, among other aspects.



In Argentina, the signage varies depending on the type of LC, which can be urban or rural, with or without a barrier. These are regulated by SETOP Resolution No. 7/81.

RURAL LEVEL CROSSING WITHOUT BARRIER

H.13 Horizontal Crossing Sign (horizontal sign)

This signal warn of the proximity of a railway level crossing.

P.3 Sign: Saint Andrew's Cross and Phonoluminous Indicator

This sign marks the boundary of the rail crossing zone, where the train has priority.

The blinking phonoluminous indication warns of the approach of a railway vehicle to the crossing.

R.15 Speed Limit Signs

Speed limits are indicated, such as: 40 km/h

R.8 No Parking

Warns of the proximity to a railway crossing.

P.1 Railway Crossing Sign/ P.2 Prevention Panel Sign

With three stripes, it indicates a 300-meter distance to the crossing.

R.15 Speed Limit Signs

60 km/h

P.1 Railway Crossing Sign/ P.2 Prevention Panel Sign

This warns about the proximity of a railway crossing, requiring drivers to reduce speed and pay attention to the possible approach of trains.

This sign indicates the proximity to the marked object (1 stripe = 100 m).

R.15 Speed Limit Signs

30 km/h

A horizontal strip marks the stopping area for road vehicles at the crossing.

