



UIC SAFETY UNIT  
**UIC Safety Report 2020**  
Significant Accidents 2019  
Public Report

September 2020



INTERNATIONAL UNION  
OF RAILWAYS

ISBN 978-2-7461-2998-6

**Warning**

No part of this publication may be copied, reproduced or distributed by any means whatsoever, including electronic, except for private and individual use, without the express permission of the International Union of Railways (UIC). The same applies for translation, adaptation or transformation, arrangement or reproduction by any method or procedure whatsoever. The sole exceptions - noting the author's name and the source - are "analyses and brief quotations justified by the critical, argumentative, educational, scientific or informative nature of the publication into which they are incorporated" (Articles L 122-4 and L122-5 of the French Intellectual Property Code).

© International Union of Railways (UIC) - Paris, 2020

# UIC Safety Report 2020

## Table of contents

Foreword by the UIC Director General

UIC Safety Database Members and data availability

Executive summary by the Chairman of the Safety Performance Group

Part 1 - General report on significant accidents 2019

Part 2 - Time series and trends

### NOTE:

The most recent information in this report is from 2019. This report is being written in 2020: the year that the COVID-19 pandemic is roaming the earth. Huge health and economic impact also affects railway operations on a large scale. As members of the UIC Safety Performance Group, we want to express our sympathy to all those in the railway sector who suffer from its consequences. Next year's report will show the effect of this crisis on railway safety.

## Foreword

This is UIC's 14th report on rail safety around the world: 14 years of system improvement with the number of accidents falling by half in most countries – this is the result of a proactive policy prioritising safety.

This report is derived from information contained in the UIC Safety Database, which is provided by UIC members on a voluntary basis. This database launched in 2006 with 19 members but has grown over time and now boasts 31 contributing members.

The momentum is powerful. Last year, three infrastructure managers began adding their contributions: RZD (Russia), OSE (Greece) and KRRI (South Korea). This year, four new companies are included in the report: FTiA (Finland), UZ (Ukraine), SAR (Saudi Arabia) and SETRAG (Gabon).

I urge all UIC member infrastructure managers to provide the Safety Database with information about any significant accidents that have taken place on their network. Completeness is necessary to ensure the quality of our analyses, and UIC can be of most value to its members when information is shared and then processed together.

UIC was founded almost a century ago and this longevity is proof of its importance to its members. But we shall not rest upon our laurels. Let us work together to strengthen the railway system and show that we offer the only sustainable form of transport, in both the short and the long term.

We would like to thank all those of you who contribute and those who are planning to contribute very soon, and we hope that those of our members who have not yet considered the issue give it careful thought.

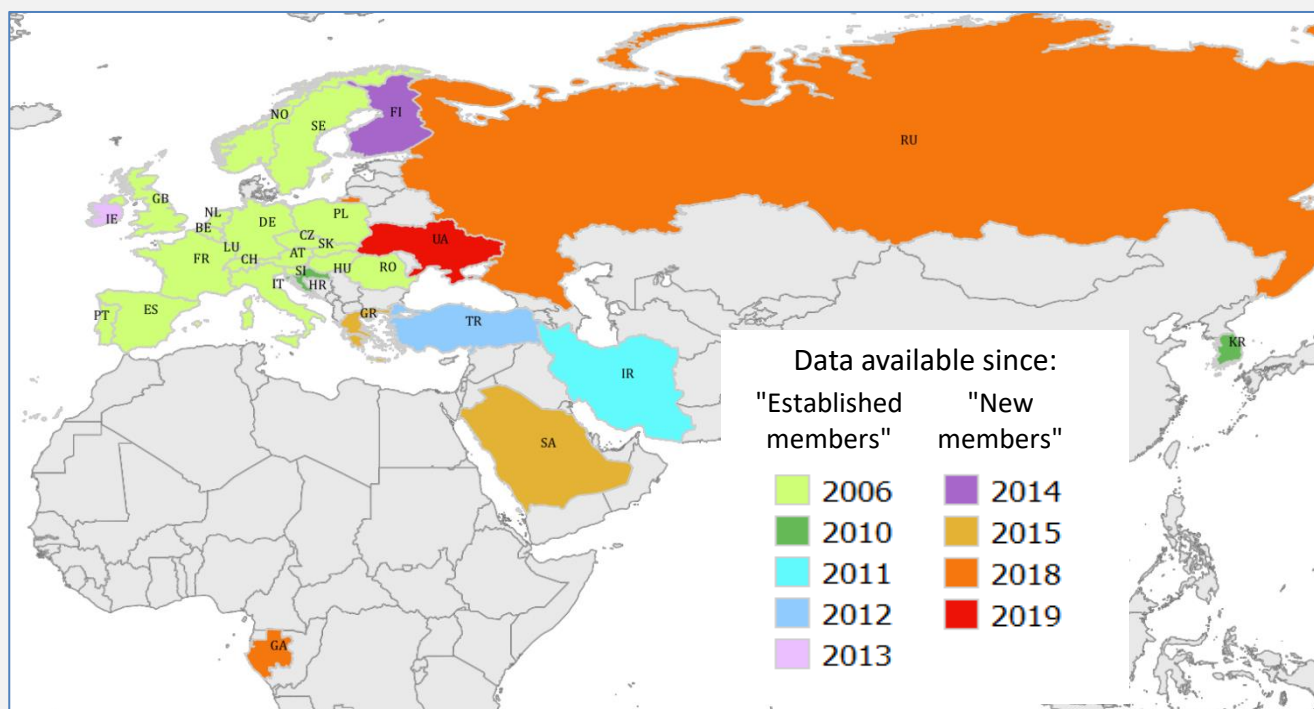
**François Davenne**  
UIC Director General

## UIC Safety Database Members and data availability

Company	Country	Code
ADIF	Spain	ES
ADIF AV	Spain	ES
Bane NOR SF	Norway	NO
CFL	Luxembourg	LU
CFR SA	Romania	RO
CIE	Ireland	IE
DB AG <sup>2</sup>	Germany	DE
FTIA	Finland	FI
HZ	Croatia	HR
Infrabel <sup>2</sup>	Belgium	BE
IP	Portugal	PT
KRRI	South Korea	KR
MÁV	Hungary	HU
ÖBB	Austria	AT
RAS-EL	Greece	GR

Company	Country	Code
PKP	Poland	PL
PRORAIL <sup>1</sup>	Netherlands	NL
RAI	Iran	IR
RFI	Italy	IT
RSSB <sup>2</sup>	United Kingdom	GB
RŽD	Russia	RU
SAR	Saudi Arabia	SA
SBB CFF FFS <sup>2</sup>	Switzerland	CH
SETRAG	Gabon	GA
SNCF Réseau <sup>2</sup>	France	FR
SŽ	Slovenia	SI
SŽ (ex-SŽDC)	Czechia	CZ
TCDD	Turkey	TR
Trafikverket <sup>2</sup>	Sweden	SE
UŽ	Ukraine	UA
ŽSR	Slovakia	SK

<sup>1</sup> Chair and <sup>2</sup> Members of the Safety Performance Group



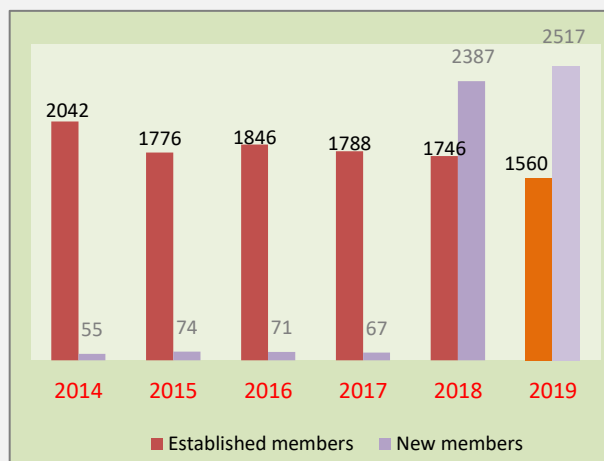
Railway companies that provided data since at least 2013 are considered as "established members".

## Executive summary

For railway safety the year 2019 is the best year ever! Thanks to all the efforts made by railway companies and infrastructure managers we see (at equal perimeter and compared to 2018) less significant accidents, less fatalities and a decrease on the UIC Safety index. We are certainly on the path of improvement, but let us keep in mind that there is still a long way to go. It will take a strong will, funding and long term focus to reduce the number of 2286 fatalities to zero.

### Number of significant accidents

From 2006 till 2014 the annual number of significant accidents has decreased with around 25%. In the period of 2015-2018 we see a plateau around 1790 significant accidents per year. The number of significant accidents declared by established members in 2019 (1570) is lower than all previous years. This means that we see a continuation of the general improvement of railway safety. Although networks have different sizes and numbers of accidents differ between countries, the overall picture that we see among the established members compared to the new members is comparable.

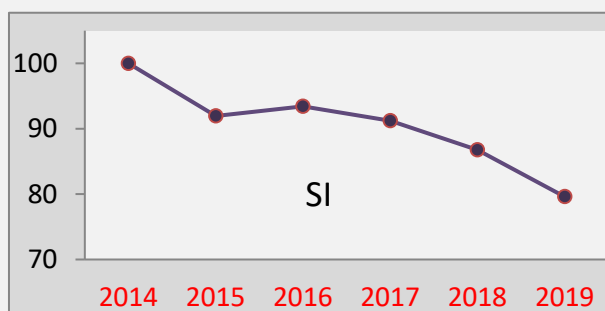


### Number of fatalities (excepting Ukraine)

In 2019 we recorded 349 less fatalities (-13%) than in the previous year for all members, excepting Ukrainian Railways for which 2018 data are not available. The types of accidents the railway sector can influence most directly (train collisions, derailments, fires and shunting operations) remain at a low level (2% of all fatalities). On level crossings we see 21% less fatalities and the number of fatalities related to individuals hit by train has decreased by 12%. These figures represent remarkable reductions!

Fatalities	2018	2019	Diff.
Individual hit by train or falling from a train (outside LC)	2 152	1 893	-259
Level crossing accidents	428	337	-91
Other accidents (train collisions, derailments, fires and shunting operations)	54	55	1
<b>Total</b>	<b>2 634</b>	<b>2 285</b>	<b>-349</b>

### UIC Safety index (established members)



The UIC Safety Index is actually a weighted number of accidents, whereby passenger and staff victims and internal causes are weighted more heavily than trespasser victims and external causes. In addition, a higher number of victims is weighted more heavily than a lower number. The decrease in the index from 2014 to 2015 is followed by two level years. 2019 seems to be picking up the long term improvement of general safety level.

**Bart Hoogcarspel**  
Chairman of Safety Performance Group

---

## Part 1

# General report on significant accidents

---

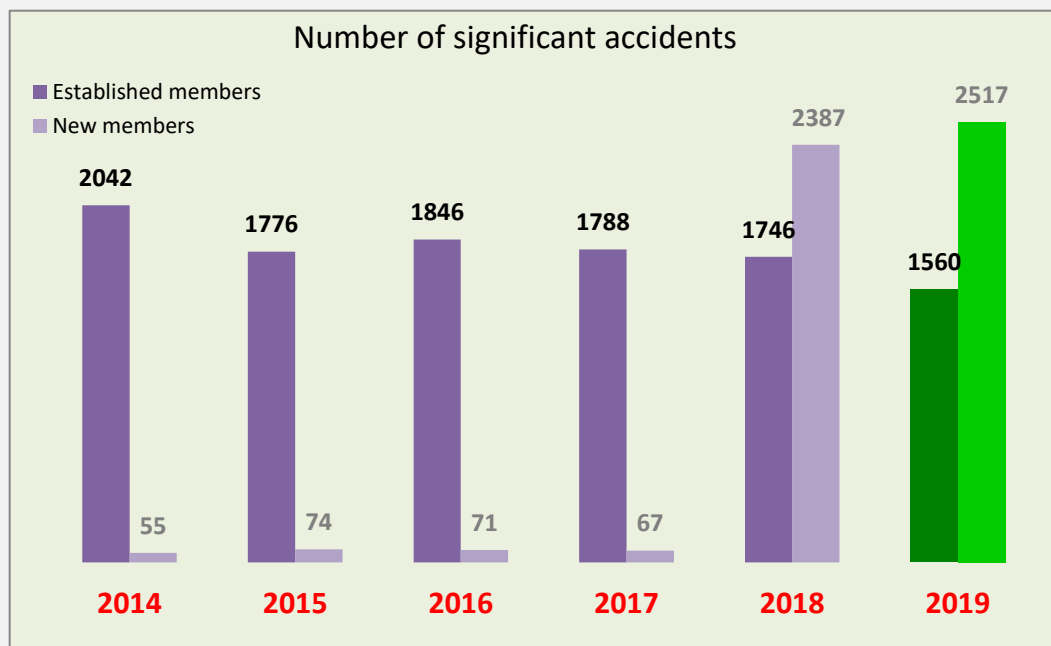
## Part 1 - General Safety Indicators for the year 2019

- 1.01 Evolution of significant accidents and UIC Safety Index
- 1.02 Types of accidents according to UIC-SDB and EU definitions
- 1.03 Main causes of accidents
- 1.04 Trend of accidents and rates on the last six years
- 1.05 Accidents by type
- 1.06 Fatalities and serious injuries by type of accident
- 1.07 Distribution of victims
- 1.08 Victims by type of accident according to Safety Directive definitions
- 1.09 Accidents by location details
- 1.10 Accidents at level crossings
- 1.11 Number of accidents and victims by type of accident
- 1.12 Passenger victims by type of accident and location
- 1.13 Staff victims by type of accident and location
- 1.14 Victims by type of traffic
- 1.15 Accidents by type and number of victims
- 1.16 UIC Safety Index
- 1.17 Accidents and victims by type of accident, causes and location

*NB: the number 0 is indicated by the sign "-"*



## 1.01 Evolution of significant accidents and UIC Safety Index

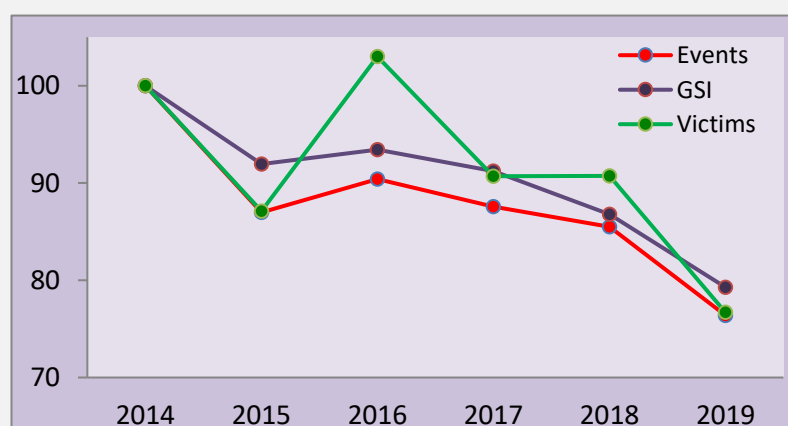


**“Significant accident”** means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to stock, track, other installations or environment, or extensive disruptions to traffic, excluding accidents in workshops, warehouses and depots.

The UIC Safety Database integrated in 2019 and 2020 seven new members depicted in light colour on the graph above.

Country	Data provider	Period
South Korea	Korean rail Research Institute (KRRI)	2010 - 2019
Greece	Rail Regulatory Authority (RAS-EL)	2015 - 2019
Finland	Federal Transport Infrastructure Administration (FTIA)	2014 - 2019
Russia	JSC Russian Railways (RŽD)	2018 - 2019
Gabon	SETRAG	2018 - 2019
Saudi Arabia	Saudi Arabian Railways (SAR)	2015 - 2019
Ukraine	Ukrainian Railways (UŽ)	2019

The number of events at Established members observed in 2019 a decrease of -10% compared to 2018 and -15% to the average on the period 2014-2018. The graph compares the trends of the UIC Safety Index (GSI) with the trends of number of events and number of victims (Base 100 in 2014) for Established members.



## 1.02 Types of accidents according to UIC-SDB and EU definitions

Types of accidents as defined in UIC – SDB	Additional information from UIC -SDB	Types of accidents as defined in EU Safety Directive
3,0%	Derailment of trains	3,0% Derailment of trains
0,5%	Train collision with another train	0,5% Train collision with another train
10,9%	Train collision with an obstacle	2,9% Train collision with an obstacle not at LC
	8,0% Train collision with an obstacle at LC	12,8% LC accidents, including accidents involving pedestrians at LC
81,0%	Individual hit by a train	
	4,8% Individual hit by a train at LC	77,2% Accidents to persons caused by rolling stock in motion, with the exception of suicides.
	76,2% Individual hit by a train not at LC	
1,0%	Individual falling from a train	
0,3%	Fire in rolling stock	0,3% Fire in rolling stock
0,1%	Electrocution by overhead line or third rail	3,3% Other types of accidents
0,0%	Accident involving dangerous goods	
3,1%	Shunting operations	
0,0%	Runaway vehicles	

- 82% of accidents involved individuals hit by a train or falling from a train.
- Collision with an obstacle was the second most common accident (11% of all accidents).
- Accidents at level crossings accounted for 13% of all significant accidents.
- Accidents during shunting operations and involving runaway vehicles are separated to better fit with the EU definitions.
- Accidents at level crossings are separated in the UIC database between collisions with an obstacle (motorized vehicle) and pedestrians (or cyclists) hit by a train.

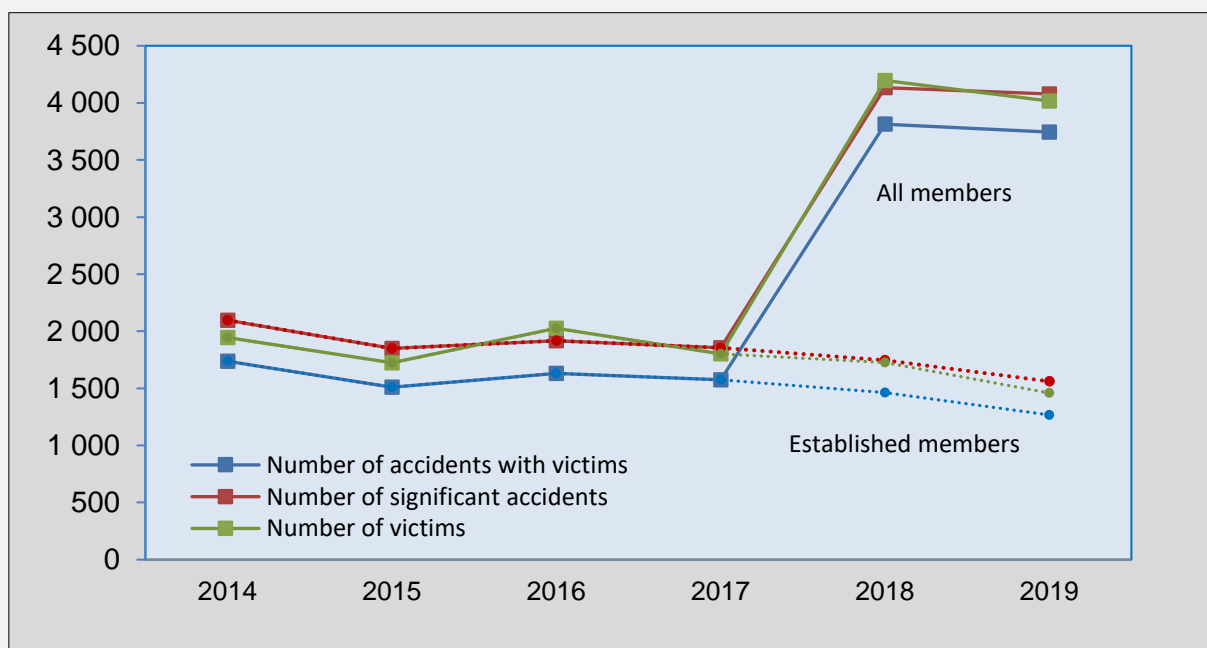
### 1.03 Main causes of accidents

2019	Causes at first level	Causes at second level	
EXTERNAL CAUSES      91,9%	THIRD PARTIES    90,4%	Trespassing	75,3%
		Vehicle (LC accident)	7,8%
		Pedestrian (LC accident)	5,1%
		Pedestrian on public railway area	1,6%
		Other or not specified	0,6%
	WEATHER & ENVIRONMENT  1,5%	Environment	1,1%
		Weather	0,4%
INTERNAL CAUSES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      			

- Third parties are responsible for more than 90% of accidents.
- Internal causes relate to both the infrastructure manager and railway undertakings.

### 1.04 Trend of accidents and rates on the last six years

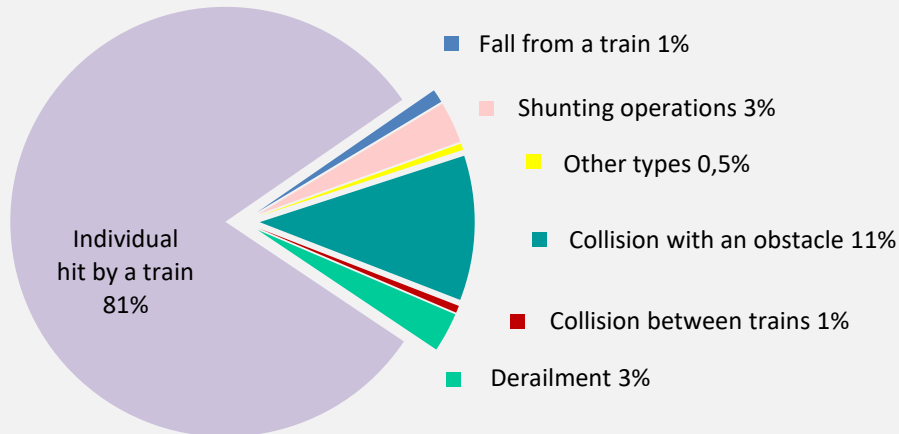
ALL RAILWAYS	2014	2015	2016	2017	2018	2019
Number of significant accidents	2 097	1 850	1 917	1 855	4 133	4 077
Significant accidents per million train-km	0,47	0,42	0,43	0,40	0,66	0,63
Number of accidents with victims	1 737	1 510	1 630	1 575	3 813	3 744
Accidents with victims per million train-km	0,39	0,34	0,36	0,34	0,61	0,58
Number of victims	1 945	1 724	2 025	1 801	4 196	4 017
Victims per million train-km	0,44	0,39	0,45	0,39	0,67	0,62
Number of fatalities	1 102	987	1 130	1 019	2 634	2 543
Fatalities per million train-km	0,25	0,22	0,25	0,22	0,42	0,39
Number of million train-kilometres	4 421	4 449	4 493	4 601	6 260	6 494



The increases observed in 2018 are linked to the incorporation of important new members into the UIC Safety Database.

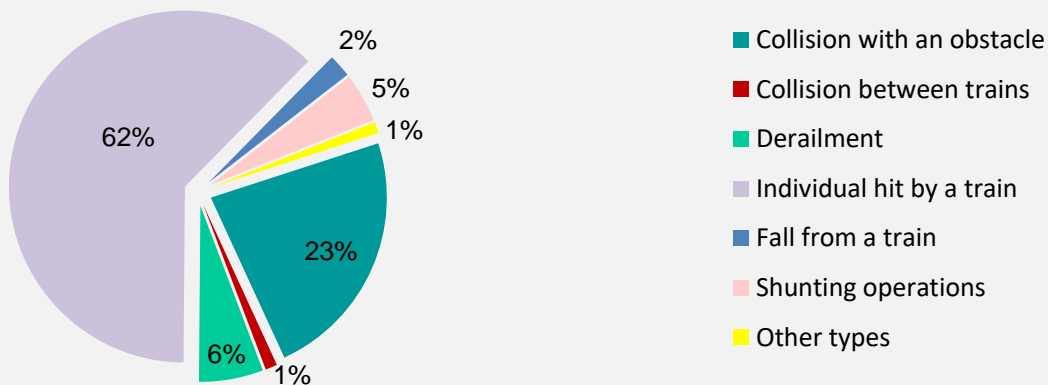
## 1.05 Accidents by type

**2019**

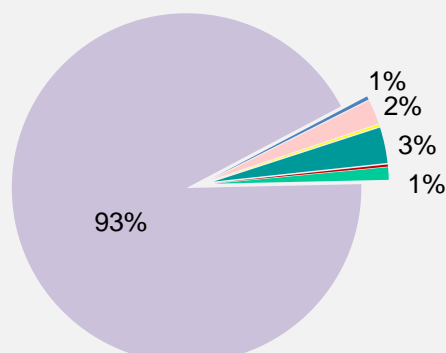


- "Collision with an obstacle" includes collisions at LC.
- "Individual hit by a train" includes pedestrians at LC.
- "Other types": electrocutions, fires in rolling stock, dangerous goods and runaway vehicles
- For LC accidents, refer to graph 1.10.

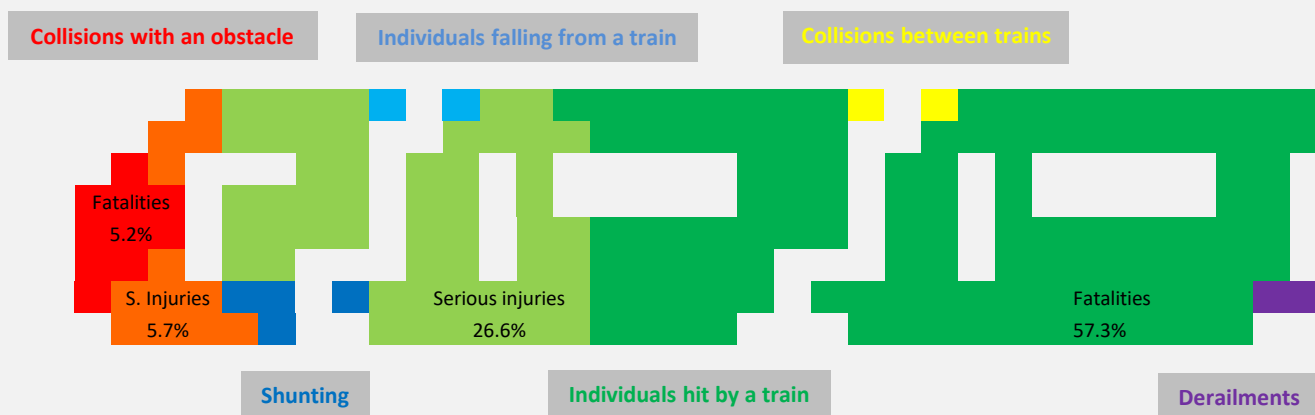
### Established members



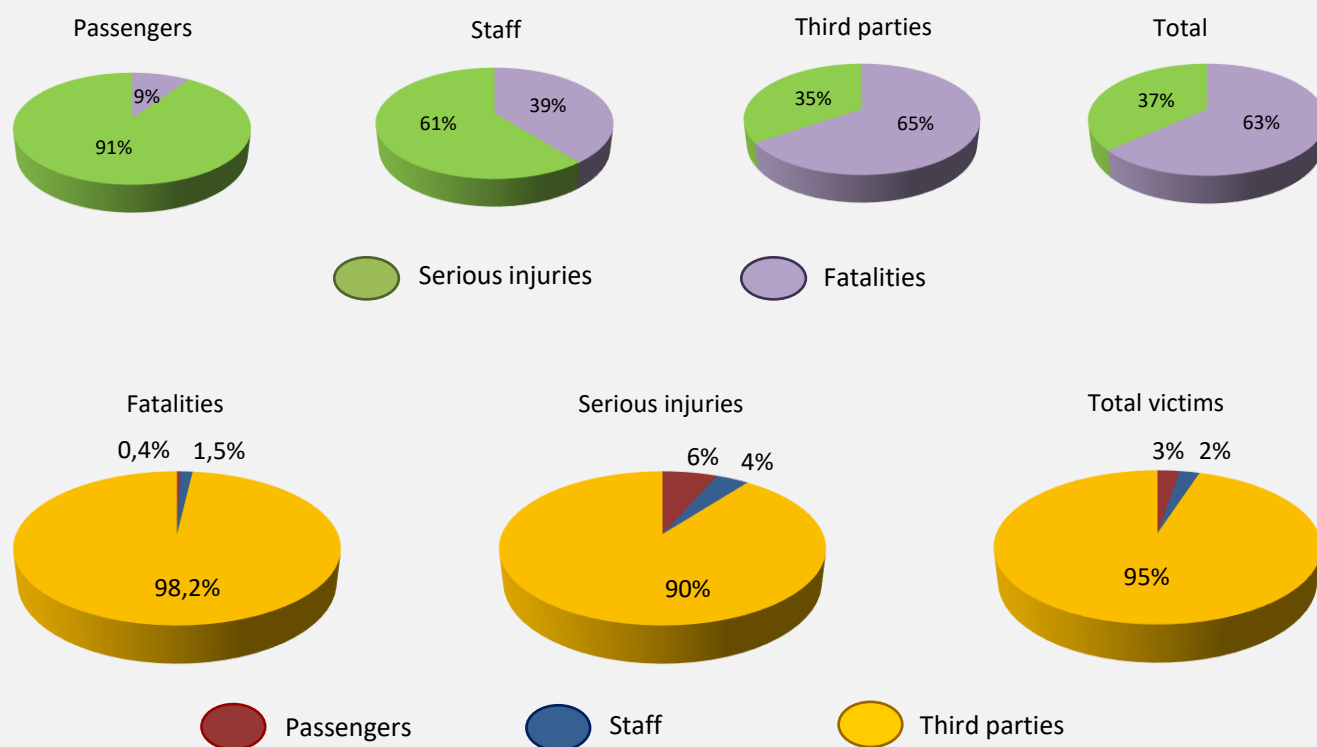
### New members



## 1.06 Fatalities and serious injuries by type of accident



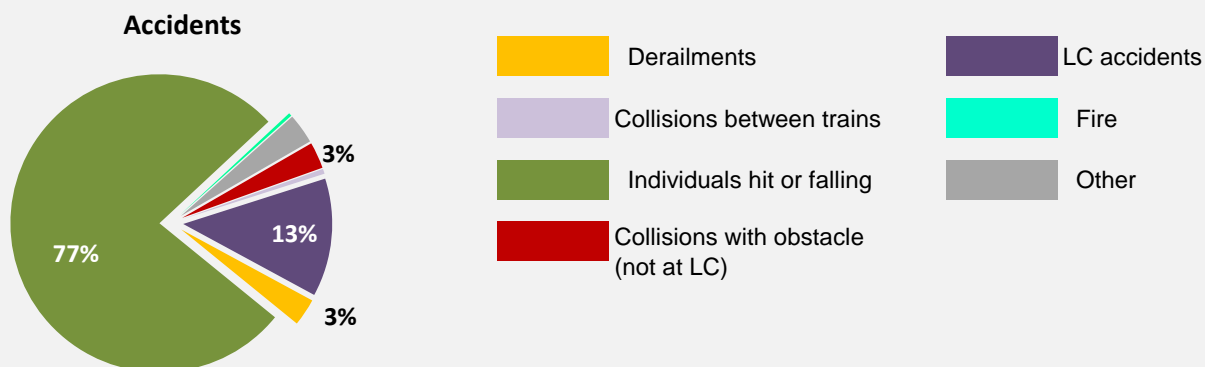
0



Reading method: fatalities account for 9% of passenger victims and passengers represent 0,4% of fatalities.

- Third parties represented 98% of all fatalities and 90% of serious injuries.
- Passengers accounted for 3% of all victims.

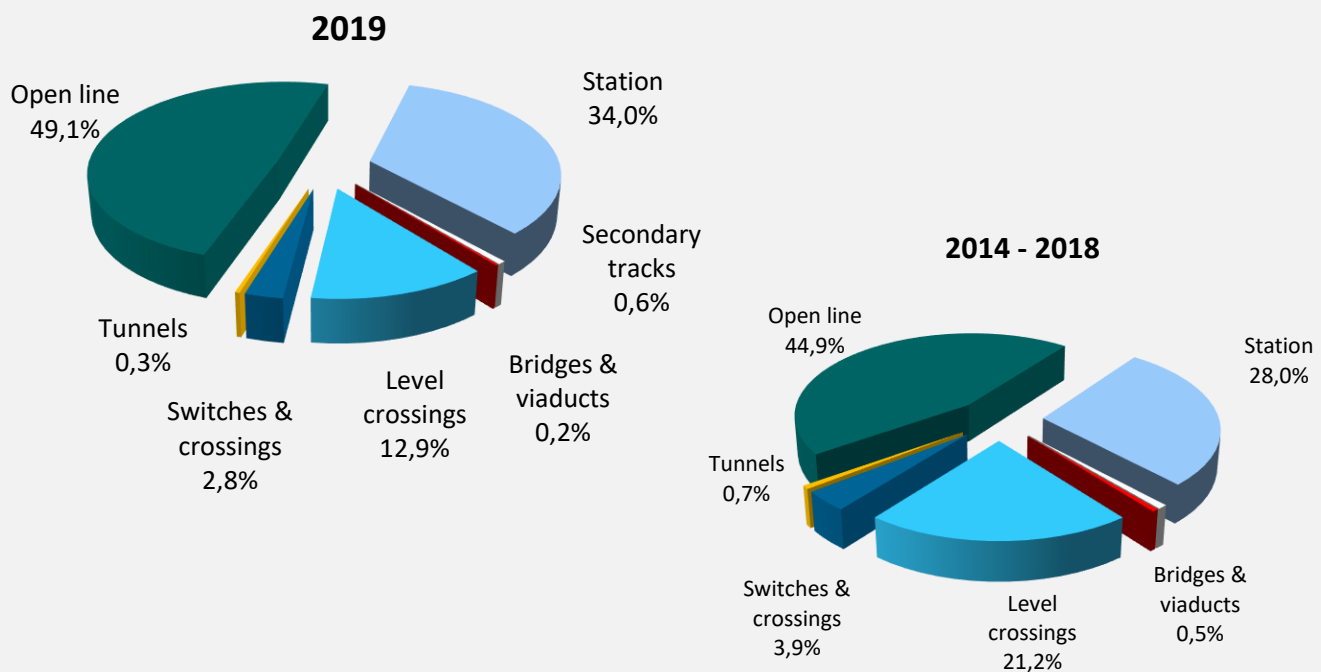
## 1.08 Victims by type of accident according to Safety Directive definitions



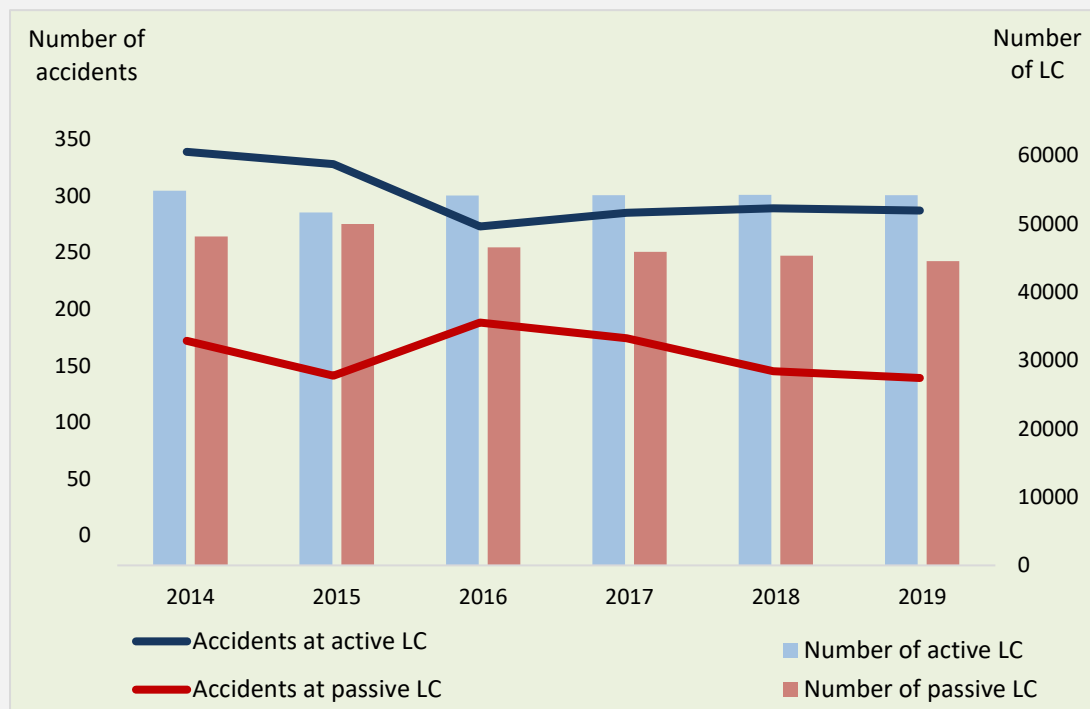
Breakdown of human consequences			
	Fatal.	Injur.	All
Passengers	0,2%	2,4%	3%
Staff	0,9%	1,4%	2%
Third parties	62,1%	32,9%	95%
All categories	63%	37%	100%

Type of accident	Number of events	%	Fatalities			Serious injuries		
			Passengers	Staff	3rd parties	Passengers	Staff	3rd parties
Collisions with obstacle (not at LC)	117	2,9%	-	-	13	-	2	6
Collisions between trains	22	0,5%	-	7	-	26	10	-
Level crossings	523	12,8%	-	1	349	12	6	268
Derailment	121	3,0%	3	3	-	35	1	1
Individuals & rolling stock in motion (not at LC)	3 147	77,2%	7	21	2103	23	21	1016
Fire	14	0,3%	-	-	-	-	1	-
Other types	133	3,3%	-	5	31	-	16	30
<b>Total</b>	<b>4 077</b>		<b>10</b>	<b>37</b>	<b>2 496</b>	<b>96</b>	<b>57</b>	<b>1 321</b>

## 1.09 Accidents by location details



## 1.10 Accidents at level crossings



This graph excludes Russia and Ukraine (split between passive and active level crossings unavailable). Accidents at passive level crossing decrease along with the decrease of the number of passive level crossings. Accidents at active level crossings are stable since 2016.

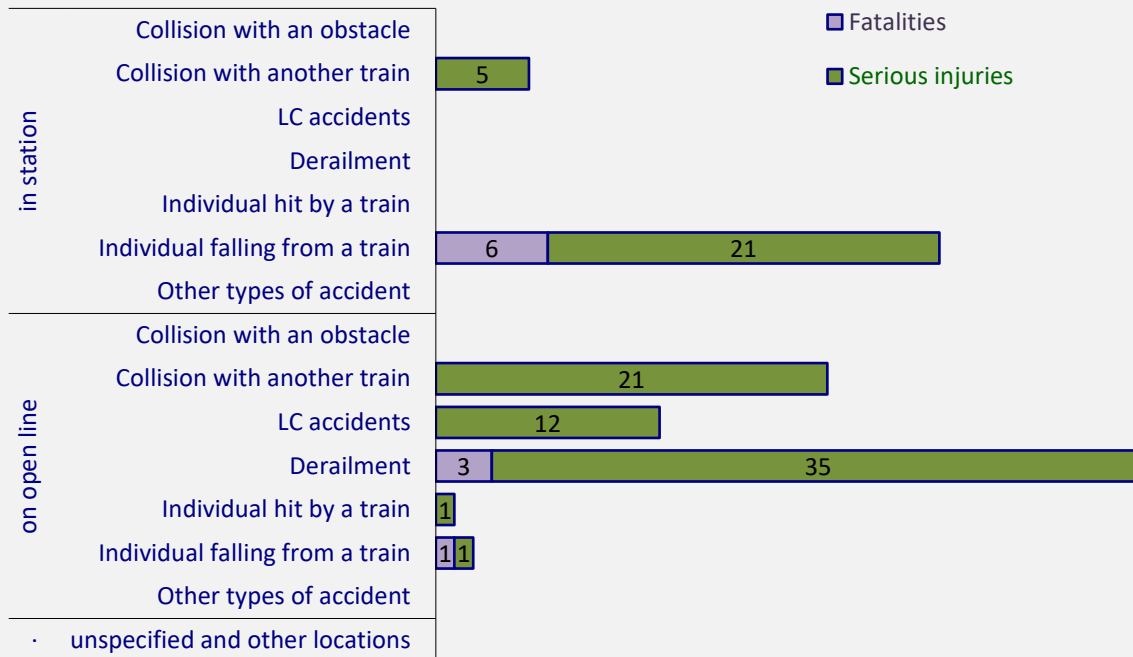


### 1.11 Number of accidents and victims by type of accident

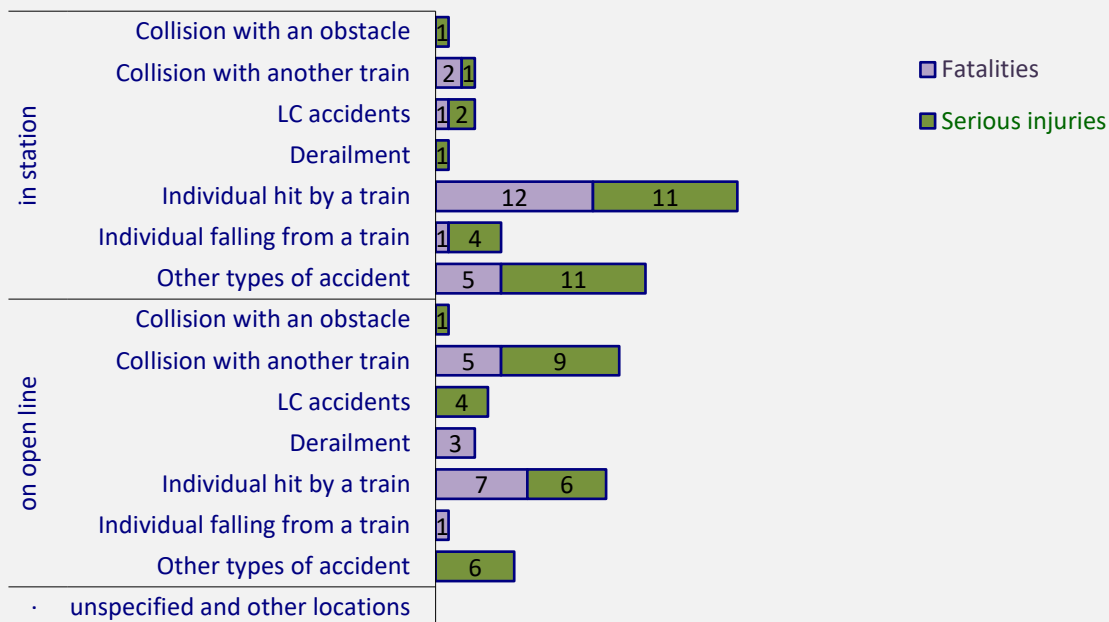
2019		Number of accidents	FATALITIES			SERIOUS INJURIES			ALL VICTIMS
			Passengers	Staff	3rd parties	Passengers	Staff	3rd parties	
At station	Collisions with an obstacle (not at LC)	23	-	-	2	-	1	2	5
	Collisions between trains	11	-	2	-	5	1	-	8
	LC accidents	79	-	1	50	-	2	30	83
	Derailments	39	-	-	-	-	1	1	2
	Hit by a train (not at LC)	1276	-	12	797	-	11	477	1297
	Falling from a train	37	6	1	1	21	4	4	37
	Other accidents	114	-	5	18	-	11	23	57
	<b>Total at station</b>	<b>1579</b>	<b>6</b>	<b>21</b>	<b>868</b>	<b>26</b>	<b>31</b>	<b>537</b>	<b>1489</b>
On open line	Collisions with an obstacle (not at LC)	94	-	-	11	-	1	4	16
	Collisions between trains	10	-	5	-	21	9	-	35
	LC accidents	437	-	-	293	12	4	238	547
	Derailments	82	3	3	-	35	-	-	41
	Hit by a train (not at LC)	1826	-	7	1303	1	6	532	1849
	Falling from a train	4	1	1	-	1	-	1	4
	Other accidents	29	-	-	13	-	6	6	25
	<b>Total in open line</b>	<b>2482</b>	<b>4</b>	<b>16</b>	<b>1620</b>	<b>70</b>	<b>26</b>	<b>781</b>	<b>2517</b>
not specified		16	-	-	8	-	-	3	11
<b>GRAND TOTAL</b>		<b>4077</b>	<b>10</b>	<b>37</b>	<b>2496</b>	<b>96</b>	<b>57</b>	<b>1321</b>	<b>4017</b>

- 61% of accidents occurred on open line, whilst 39% happened in stations and yards.
- 65% of fatalities occurred on open line.
- Persons hit by a train and LC accidents represented 97% of all fatalities.

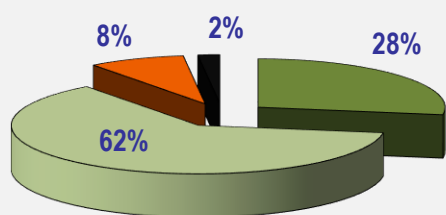
## 1.12 Passenger victims by type of accident and location



## 1.13 Staff victims by type of accident and location



### 1.14 Victims by type of traffic



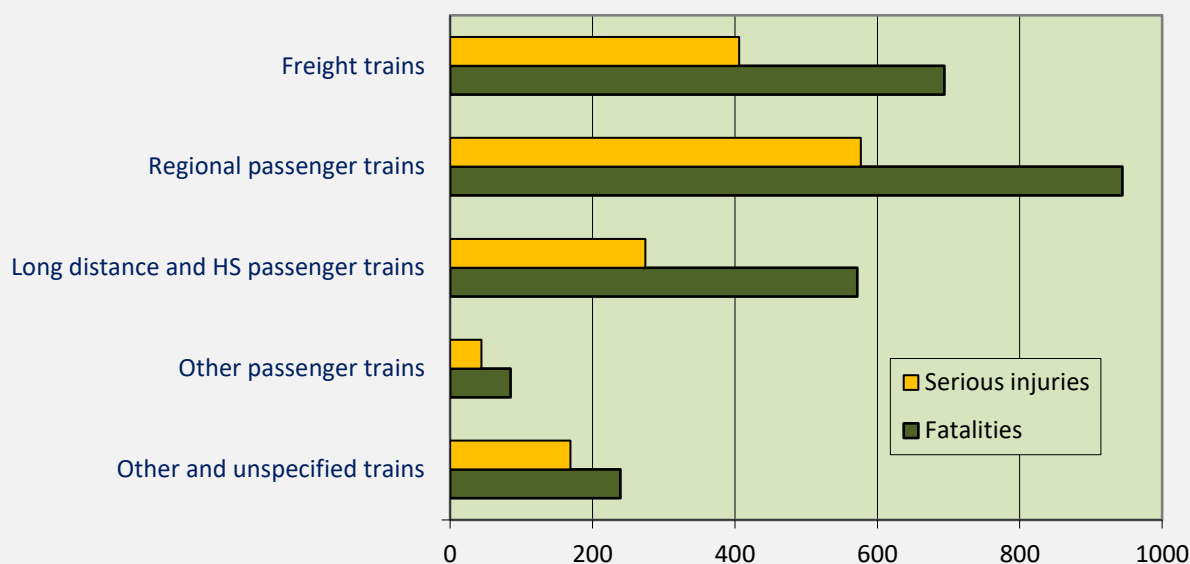
■ Freight trains

■ Passenger trains

■ Locomotives running light, infrastructure trains, unspecified trains

■ Shunting and runaway vehicles

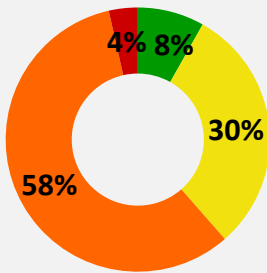
Type of accident	Freight trains	Passenger trains	Locomotives running light, infrastructure trains, unspecified trains	Shunting and runaway vehicles
Collision	20	34	6	9
Derailment	-	39	4	-
Level-crossing accidents	121	462	50	4
Accidents to persons caused by rolling stock in motion	957	1956	272	62
Other accidents	2	5	1	-
<b>TOTAL victims</b>	<b>1100</b>	<b>2496</b>	<b>333</b>	<b>75</b>



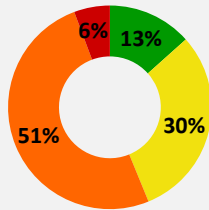
- Among accidents where the type of train is registered, regional passenger trains are involved in accidents leading to 42% of victims.
- Unfortunately not all train types have been specified in the data.

## 1.15 Accidents by type and number of victims

**All accidents 2019  
(4077 events)**

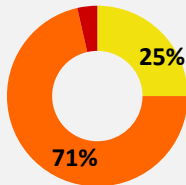


**2014 - 2018  
(11847 events)**

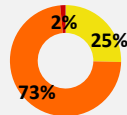


\* a victim is a fatality or a serious injury

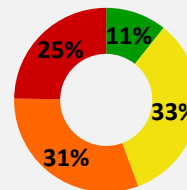
**Individual hit by a train at  
LC 2019 (196 events)**



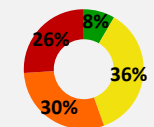
**2014 - 2018  
(847 events)**



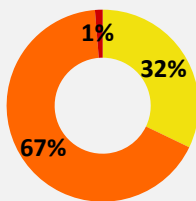
**Collision with an obstacle at  
LC 2019 (327 events)**



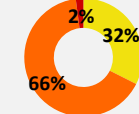
**2014 - 2018  
(1642 events)**



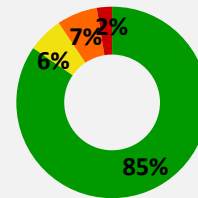
**Individual hit by a train not at  
LC 2019 (3106 events)**



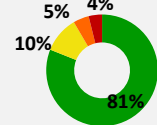
**2014 - 2018  
(7187 events)**



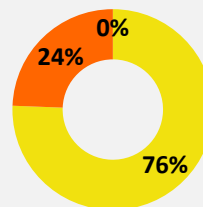
**Collision with an obstacle not  
at LC 2019 (117 events)**



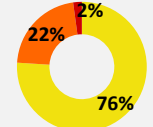
**2014 - 2018  
(616 events)**



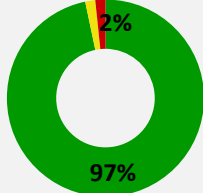
**Fall from a train 2019 (41 events)**



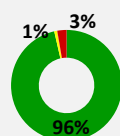
**2014 - 2018  
(325 events)**



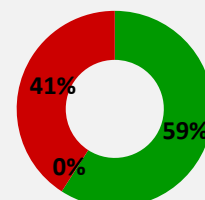
**Derailment 2019 (121 events)**



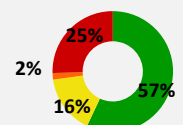
**2014 - 2018  
(556 events)**



**Collision between trains  
2019 (22 events)**

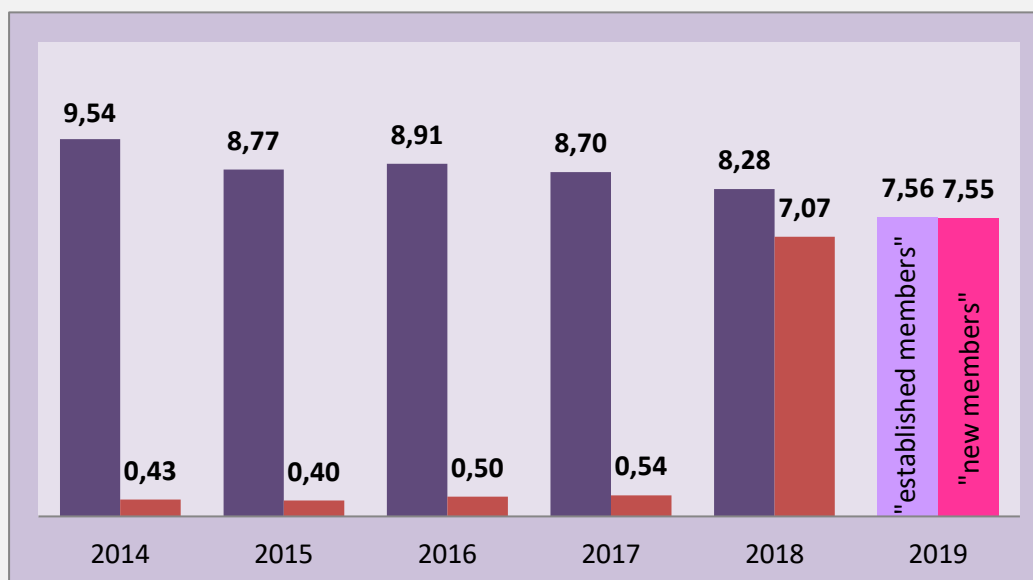


**2014 - 2018  
(114 events)**



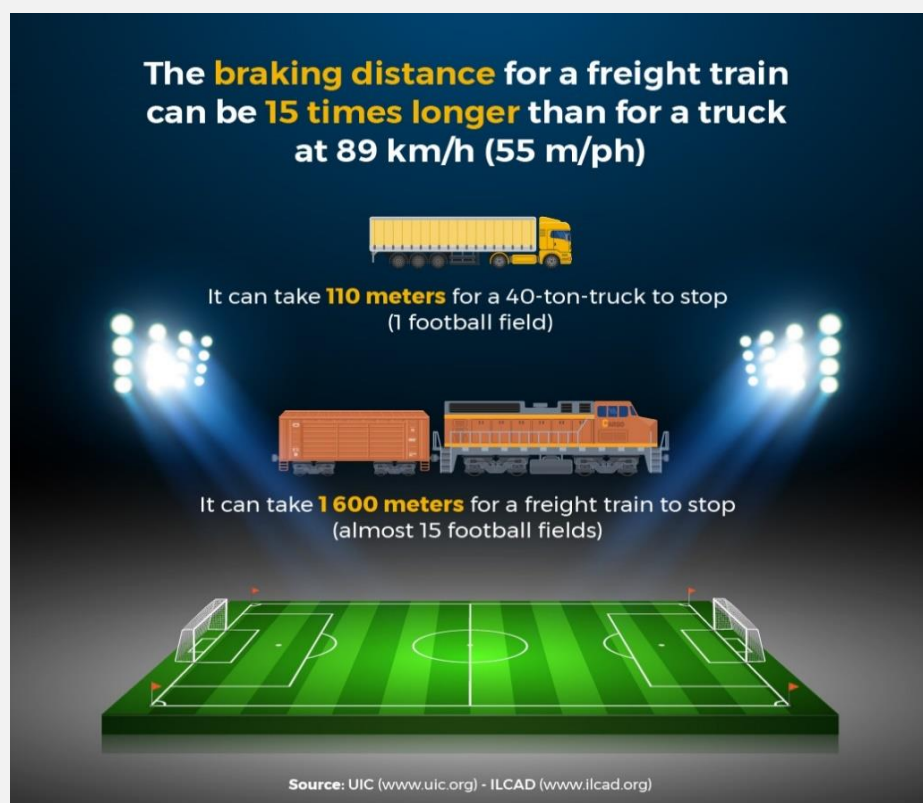
- Fires in RS: 15 events (1 serious injury)
- Electrocutions: 6 events (7 fatalities)

## 1.16 UIC Safety Index



The UIC Safety Index was created in 2015 by the Safety performance Group. It reflects more aspects than the sole number of events. Each event is weighted following the type of accident, the category of victim, the number of victims and the cause.

The exact calculation behind the UIC Safety Index is available at UIC.



### 1.17 Accidents and victims by type of accident, causes and location

Type of accidents	Causes		Location				Victims					
			Type of location		Location details		Fatal.	S. Inj.				
Individual hit by a train  3302 3354	INF	-	-	OL	1962	1991	LC	196	204	P	-	1
	RS	-	-				SC	49	50			
	HF	30	36	S	1332	1355	BV	7	7	S	20	17
	RU	-	-				T	7	7			
	WE	-	-	Ot	8	8	O	3042	3085	T	2249	1067
	TP	3271	3317									
Train collision with an obstacle  444 453	INF	28	1	OL	395	421	LC	327	432	P	-	12
	RS	8	-				SC	5	-			
	HF	15	7	S	46	30	BV	1	-	S	-	8
	RU	-	-				T	2	-			
	WE	47	2	Ot	3	2	O	108	21	T	215	218
	TP	343	443									
Individual falling from a train  41 41	INF	-	-	OL	4	4	LC	-	-	P	7	22
	RS	-	-				SC	-	-			
	HF	6	6	S	37	37	BV	-	-	S	2	4
	RU	28	28				T	1	1			
	WE	-	-	Ot	-	-	O	40	40	T	1	5
	TP	7	7									
Train collision with another train  22 43	INF	1	-	OL	10	35	LC	-	-	P	-	26
	RS	1	-				SC	5	6			
	HF	20	43	S	11	8	BV	-	-	S	7	10
	RU	-	-				T	1	2			
	WE	-	-	Ot	1	-	O	12	35	T	-	-
	TP	-	-									
Derailment  121 43	INF	44	-	OL	82	41	LC	-	-	P	3	35
	RS	32	-				SC	28	2			
	HF	24	3	S	39	2	BV	-	-	S	3	1
	RU	-	-				T	2	2			
	WE	13	-	Ot	-	-	O	84	39	T	-	1
	TP	2	39									
Electrocution  6 7	INF	-	-	OL	3	4	LC	-	-	P	-	-
	RS	-	-				SC	-	-			
	HF	-	-	S	3	3	BV	-	-	S	-	-
	RU	-	-				T	-	-			
	WE	-	-	Ot	-	-	O	6	7	T	7	-
	TP	6	7									
Fires  14 1	INF	1	-	OL	8	1	LC	-	-	P	-	-
	RS	10	1				SC	-	-			
	HF	-	-	S	6	-	BV	-	-	S	-	1
	RU	-	-				T	1	1			
	WE	-	-	Ot	-	-	O	13	-	T	-	-
	TP	1	-									

Type of accidents	Causes			Location				Victims  Fatal.   S. Inj.				
				Type of location		Location details						
Accident involving dangerous goods without release  - -	INF	-	-	OL	-	-	LC	-	-	P	-	-
	RS	-	-				SC	-	-			
	HF	-	-	S	-	-	BV	-	-	S	-	-
	RU	-	-				T	-	-			
	WE	-	-	Ot	-	-	O	-	-	T	-	-
	TP	-	-									
Accident involving dangerous goods with release  - -	INF	-	-	OL	-	-	LC	-	-	P	-	-
	RS	-	-				SC	-	-			
	HF	-	-	S	-	-	BV	-	-	S	-	-
	RU	-	-				T	-	-			
	WE	-	-	Ot	-	-	O	-	-	T	-	-
	TP	-	-									
Shunting operations  127 75	INF	5	-	OL	18	20	LC	4	4	P	-	-
	RS	2	-				SC	26	3			
	HF	57	19	S	105	54	BV	-	-	S	5	16
	RU	-	-				T	-	-			
	WE	-	-	Ot	4	1	O	86	62	T	24	30
	TP	56	55									
Runaway vehicles  - -	INF	-	-	OL	-	-	LC	-	-	P	-	-
	RS	-	-				SC	-	-			
	HF	-	-	S	-	-	BV	-	-	S	-	-
	RU	-	-				T	-	-			
	WE	-	-	Ot	-	-	O	-	-	T	-	-
	TP	-	-									

TOTAL	INF	79	1	OL	2482	2517	LC	527	640	P	10	96
	RS	53	1				SC	113	61			
	HF	152	114	S	1579	1489	BV	8	7	S	37	57
	RU	28	28				T	14	13			
	WE	60	2	Ot	16	11	O	3391	3289	T	2496	1321
	TP	3686	3868									
4077												
4017												
										2543	1474	

number of accidents	INF: Infrastructures	OL: Open line	LC: Level crossings	P: passengers
	RS: Rolling stock	S: At station	SC: Switches & Crossings	S: Staff
	HF: Human Factors	Ot: Other locations	BV: Bridges & Viaducts	T: Third parties
	RU: Railway users		T: Tunnels	
number of victims	WE: Weather-Environment		O: Other or unidentified	
	TP: Third Parties			

---

Part 2

Time series and trends 2014-2019

---



## Part 2 - Time series and trends 2014-2019

excluding Russia, Greece, Ukraine, Saudi Arabia and Gabon  
(for which full time series are not available)

### **CAUSES**

2.01 Significant accidents

2.02 Causes

2.03 Internal causes

2.04 External causes

2.05 Third parties

### **HUMAN CONSEQUENCES**

2.06 Human consequences

2.07 Severe accidents (two and more victims)

2.08 Passengers

2.09 Staff

2.10 Third parties

### **TYPE OF ACCIDENT**

2.11 Collisions with an obstacle

2.12 Collisions between trains

2.13 Derailments

2.14 Individuals hit by a train

2.15 Individuals falling from a train

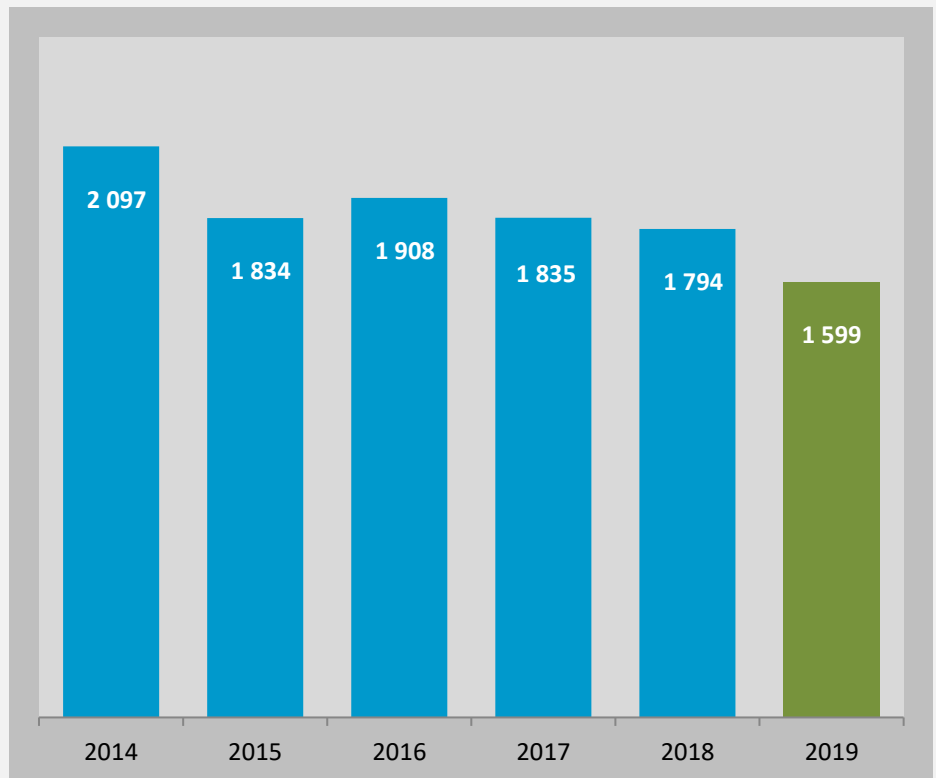
2.16 Accidents at level crossings

### 2.01a All significant accidents

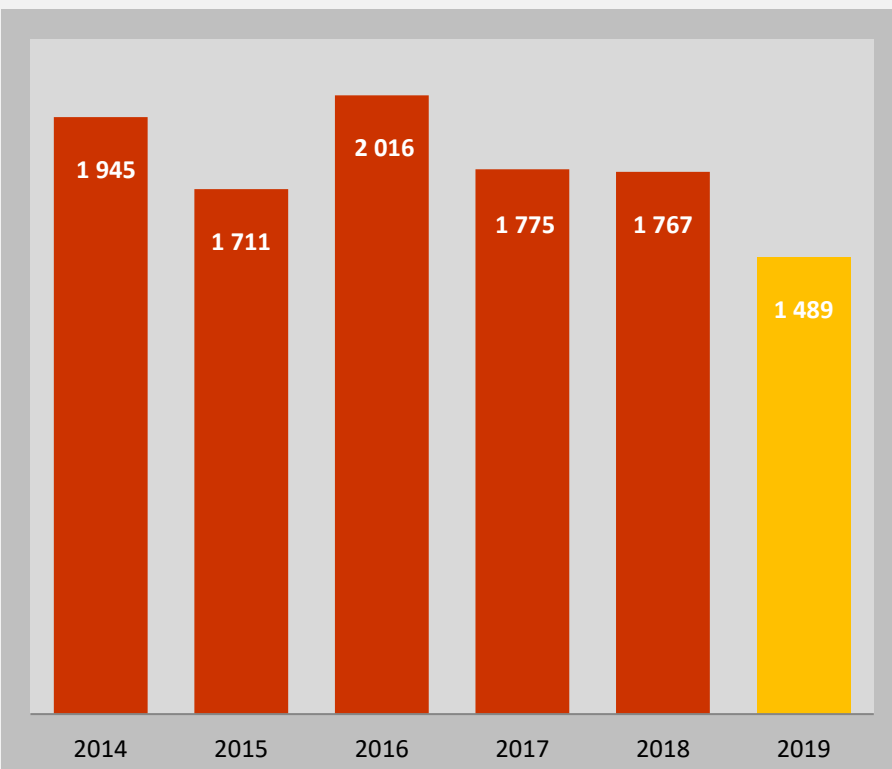
Significant accidents declared by railway members of the Safety Database dropped from 2097 in 2014 to 1599 in 2019, which means a decrease of -24%.

Trends are presented since 2014, in order to keep the same geographical perimeter along the years.

**“Significant accident”** means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to stock, track, other installations or environment, or extensive disruptions to traffic, excluding



### 2.01b Victims of rail accidents



stock, track, other installations or environment, or extensive disruptions to traffic, excluding accidents in workshops, warehouses and depots.

We observe in 2019 the best result since the establishment of the database in 2006.

The number of victims decreased - 23% compared to the year 2014.

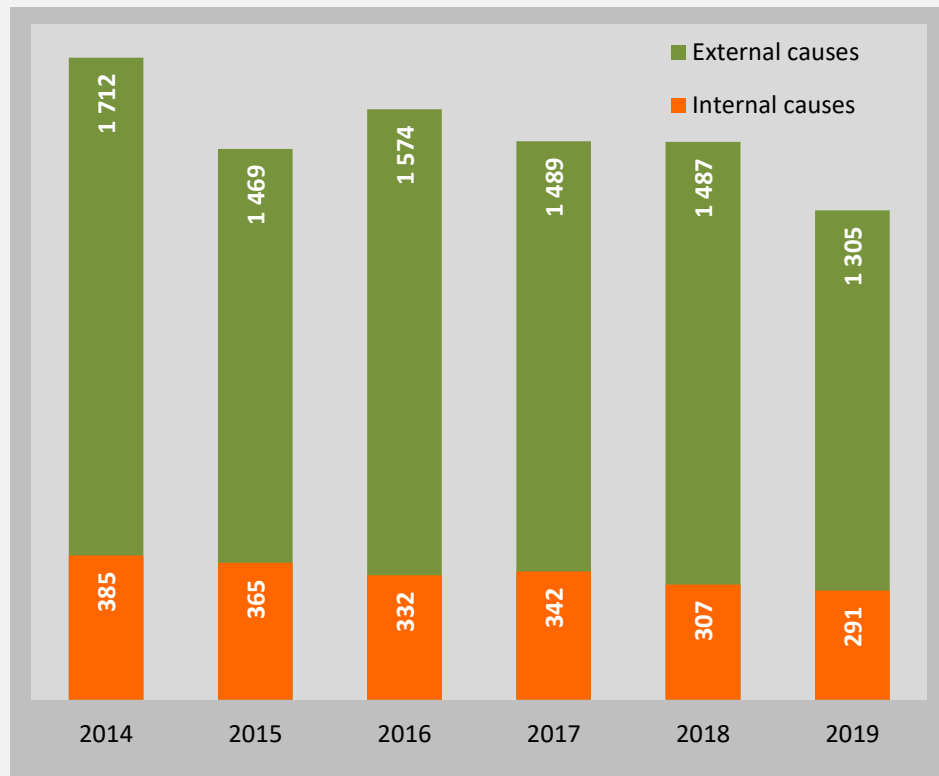
## 2.02a Accidents per internal / external causes

The number of accidents with internal causes decreased -24% between 2014 and 2019, while the number of accidents with external causes decreased -23%.

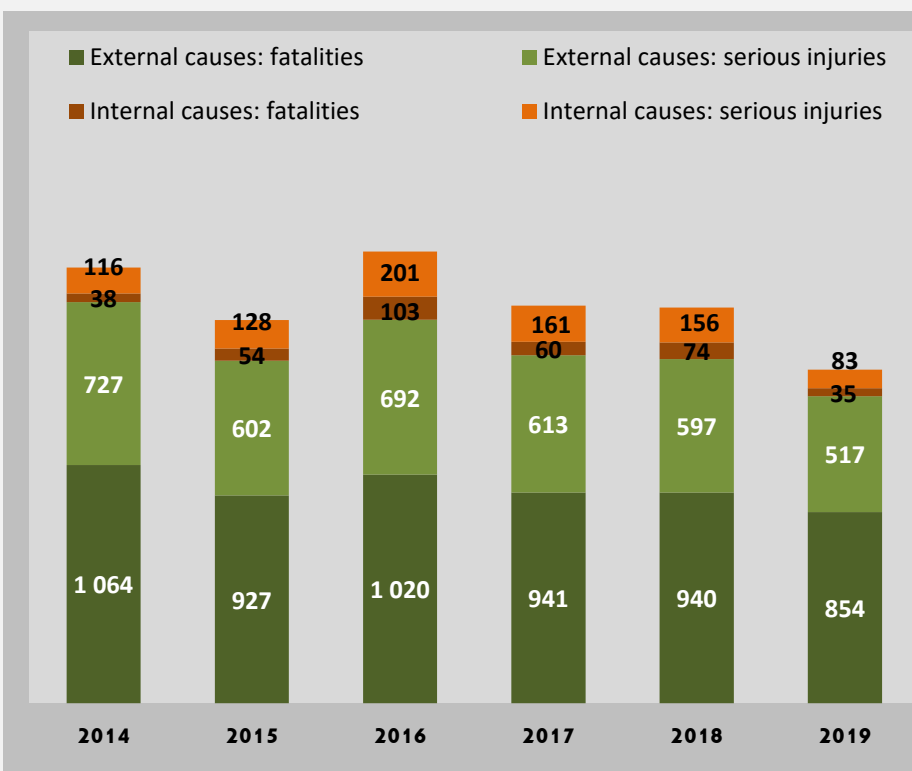
External causes are responsible for more than 80% of accidents each year.

### Reminder

- Internal causes: infrastructure, rolling stock, human factors and railway users.
- External causes: third parties, weather and environment.
- Some accidents have unidentified causes. They are excluded from the graph.



## 2.02b Victims per internal / external causes



### External causes

The number of victims for external causes between 2014 and 2016 were stable, since 2016 fatalities have decreased by -16% and serious injuries have decreased by -25%.

### Internal causes

The number of victims for internal causes between 2014 and 2016 increased, since 2016 fatalities have decreased by -66% and serious injuries have decreased by -59%.

### In the year 2019:

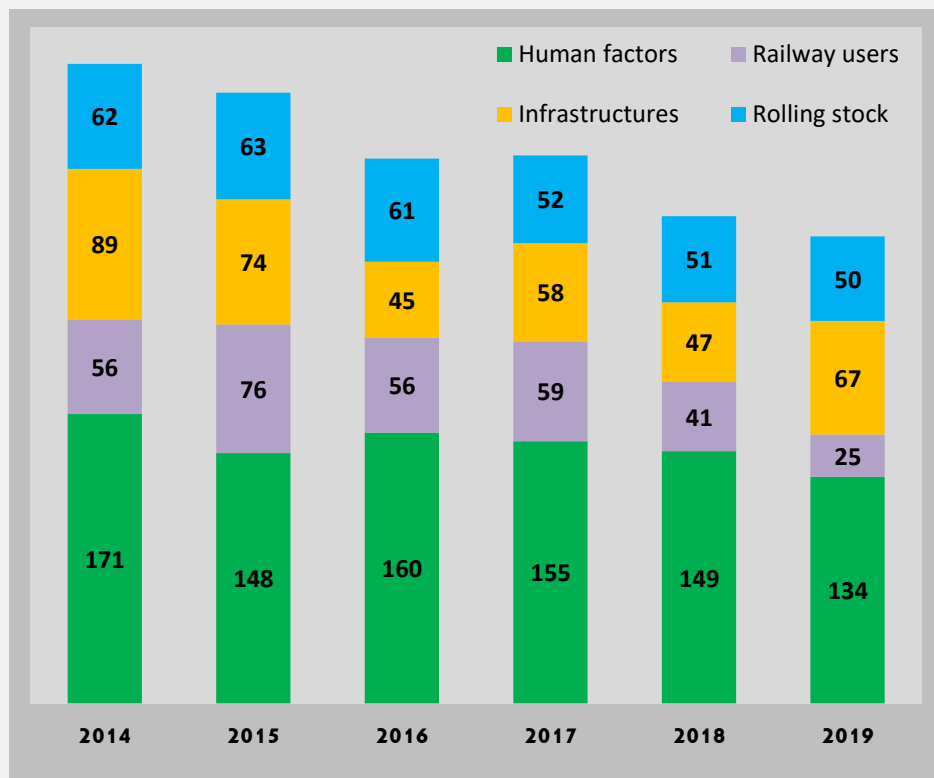
- ✓ External causes are responsible for 92% of all victims and 96% of all fatalities.
- ✓ 63% of victims of accidents with external causes are fatalities.
- ✓ Only 30% of victims of accidents with internal causes are fatalities.

### 2.03a Accidents per internal causes

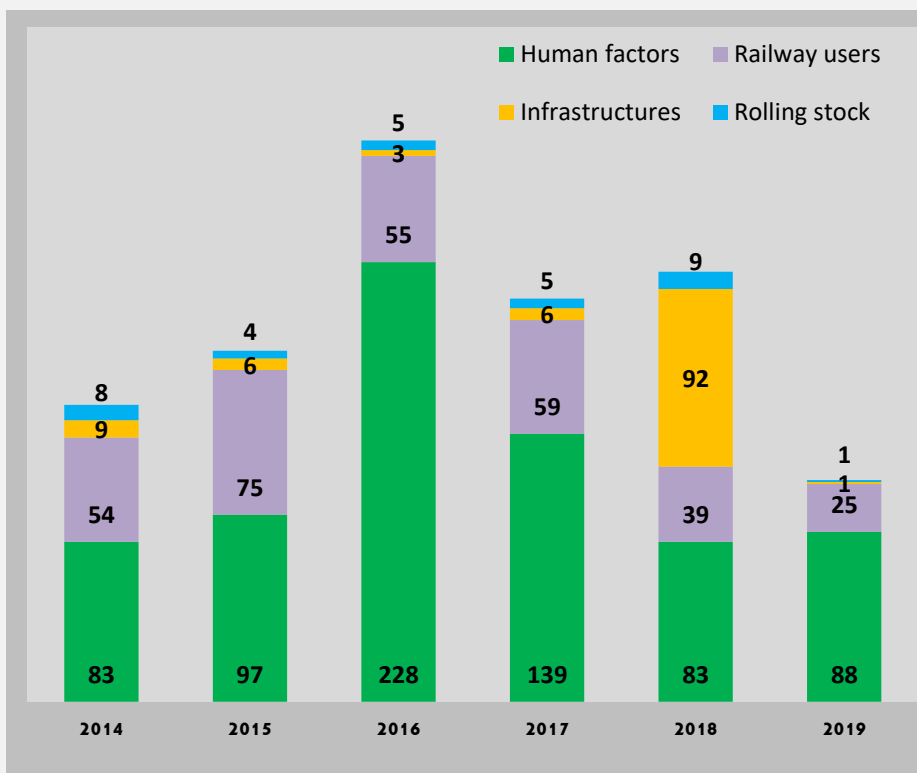
All categories of internal cause decrease on the six-year period.

The most important decrease concerns accidents with "railway users" causes (mostly passengers): 55%

As a result, the part of accidents with "railway users" cause among all accidents with internal causes decreased from 15% to 9% and accidents with "Human factors" causes rose to almost 50%.



### 2.03b Victims per internal causes



The number of victims of accidents with internal cause fell drastically between 2018 and 2019 (-48%).

Number of accidents and number of victims are quite disconnected. A few severe accidents may have a huge number of victims (year 2016, for instance).

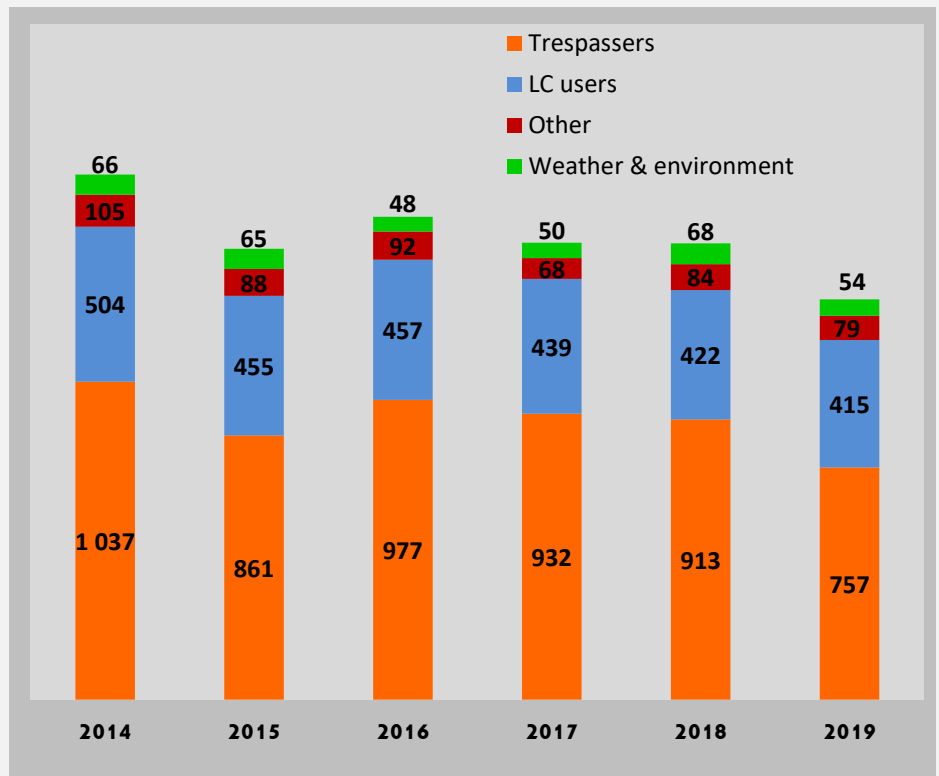
We observe a huge number of victims in accidents caused by infrastructure defects in 2018. This is mostly due to two derailments representing 85 out of 92 victims.

## 2.04a Accidents per external causes

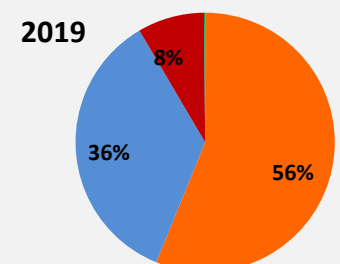
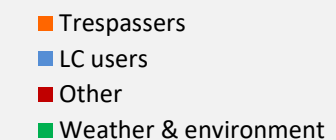
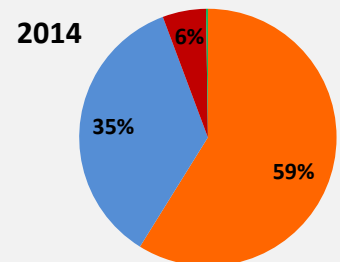
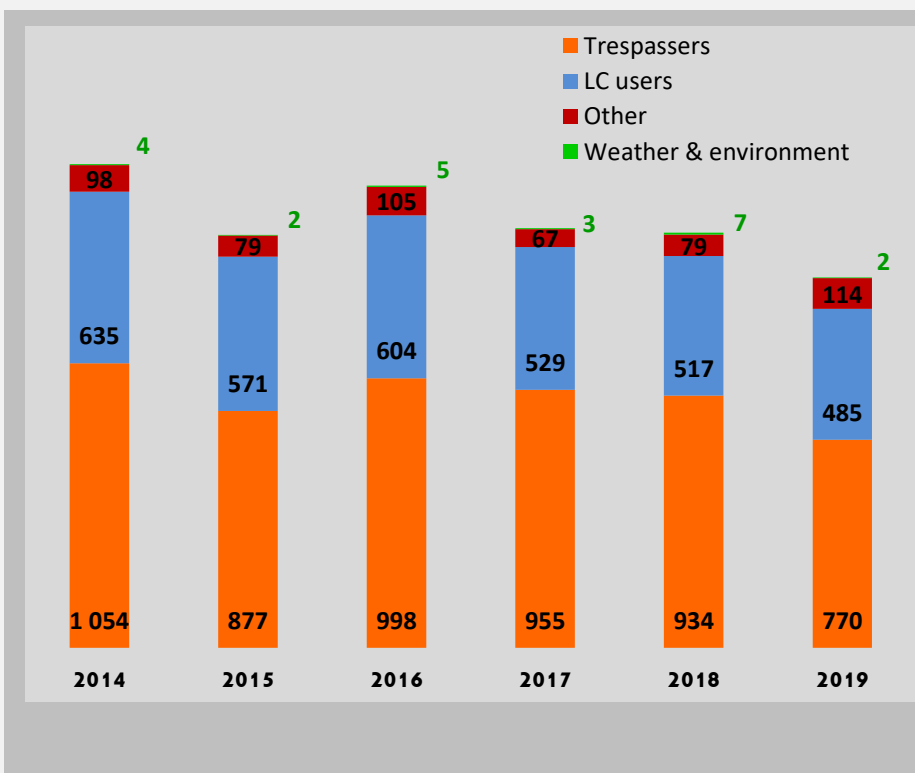
The number of accidents with external cause decreased -23% between 2014 and 2019.

Trespassers remain the most common cause of accident: 58% of all accidents with external causes in 2019. Their number only decreased -26% in the period.

LC users are causing 32% of all accidents with external causes in 2019. Their number is relatively stable since 2015, despite all awareness campaigns.



## 2.04b Victims per external causes

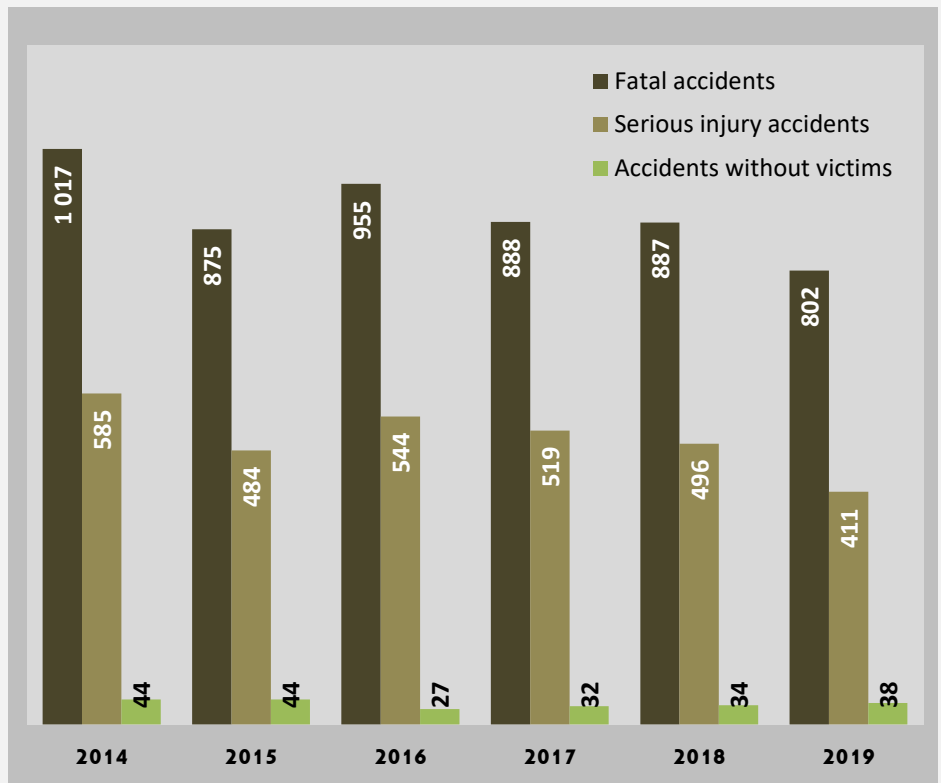


### 2.05a Accidents caused by third parties

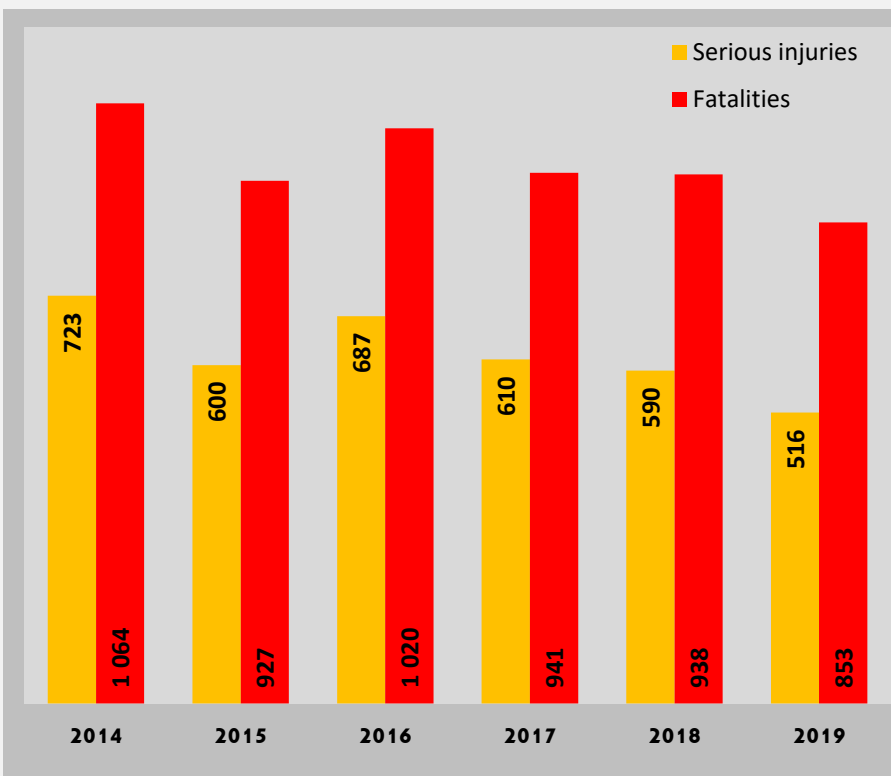
Accidents caused by third parties decreased -23% between 2014 and 2019.

96% of fatal accidents and 89% of serious injury accidents are caused by third parties (year 2019).

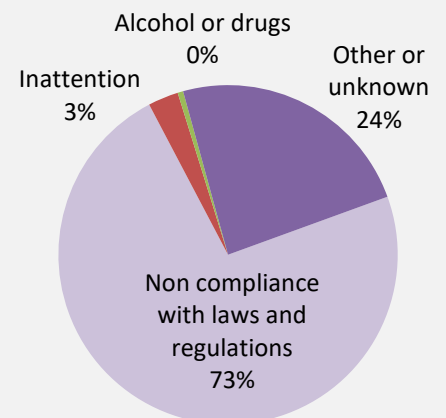
Serious injuries decreased -29% and fatalities decreased -19% on the 6-year period.



### 2.05b Victims of accidents caused by third parties



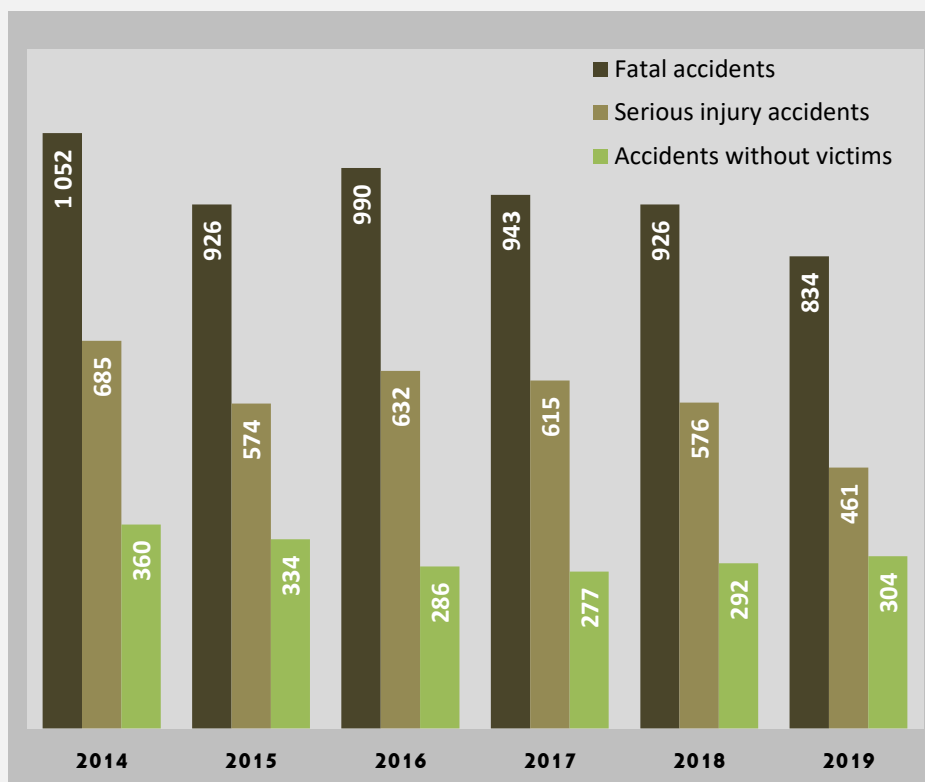
Split of victims  
per cause at third level  
2019



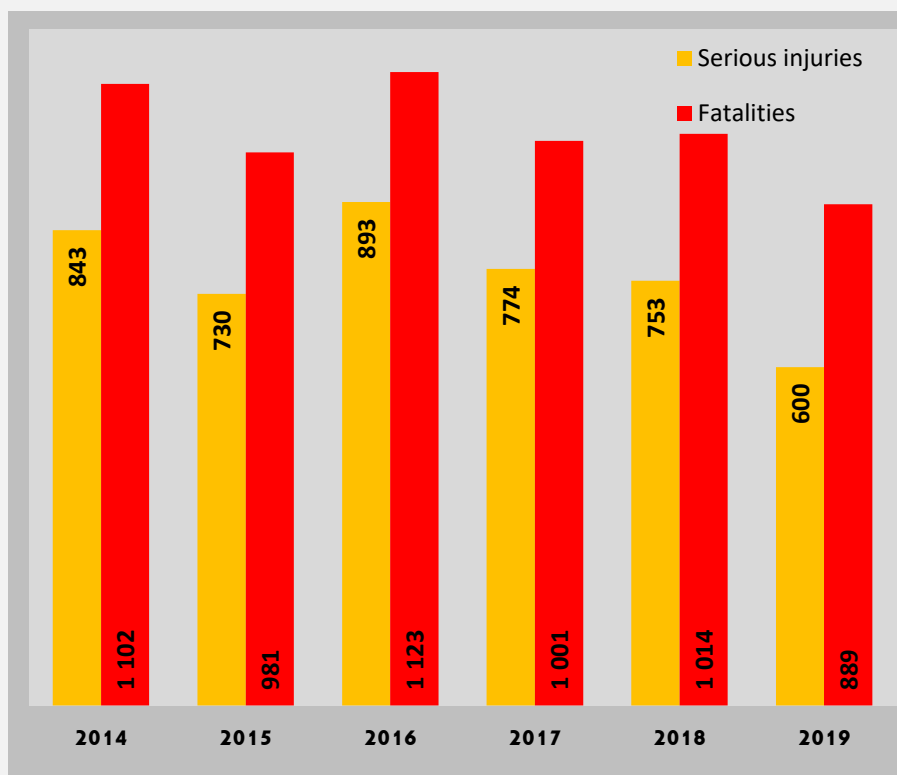
## 2.06a Accidents per human consequences

Fatal accidents roughly represent half of all significant accidents. This proportion is stable along the years.

Fatal accidents decreased by -20% from 2014 to 2019 while serious injury accidents decreased by -33%.



## 2.06b Fatalities and serious injuries



From 2014 to 2019, fatalities decreased -18% while serious injuries decreased -29%.

This evolution appears quite erratic as it might depend on a small number of severe accidents.

Every year, railway accidents lead to more fatalities than serious injuries, due to the preeminence of "individuals hit by a train" (see graph 2.14).

### 2.07a Severe accidents (two and more victims)

Severe accidents peaked in 2016 after a similar number of events in 2014 and 2015. Severe accidents decreased -35% between 2016 and 2019. They represent 6% of all accidents in 2019.

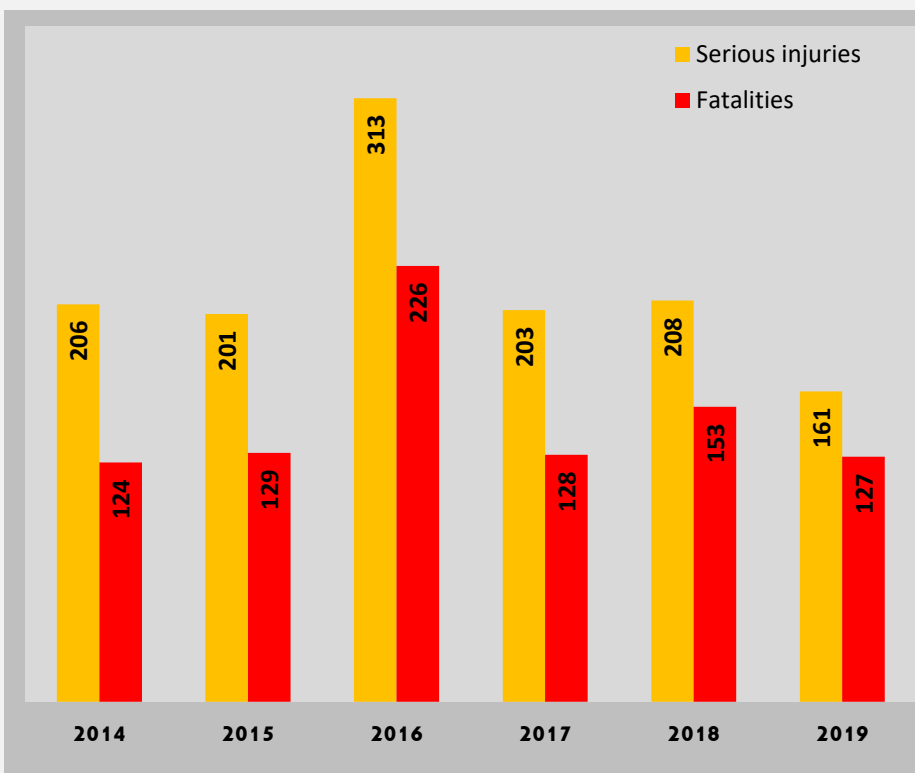
The number of collisions with road vehicles at level crossings is stable since 2017.

The heaviest accidents that occurred during 2019 are:

- a derailment due to the theft of rail fastener (39 victims, of which 4 fatalities)
- a front collision between trains (20 victims, of which 1 fatality)



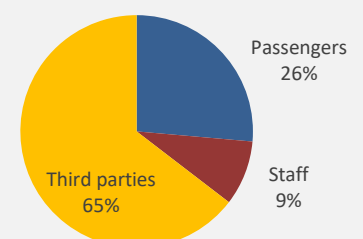
### 2.07b Victims of severe accidents



Severe accidents are hardly predictable.

The number of fatalities of severe accidents in 2019 is close to the numbers observed in 2014, 2015 and 2017. Serious injuries dropped -23% between 2018 and 2019.

Split of victims 2019

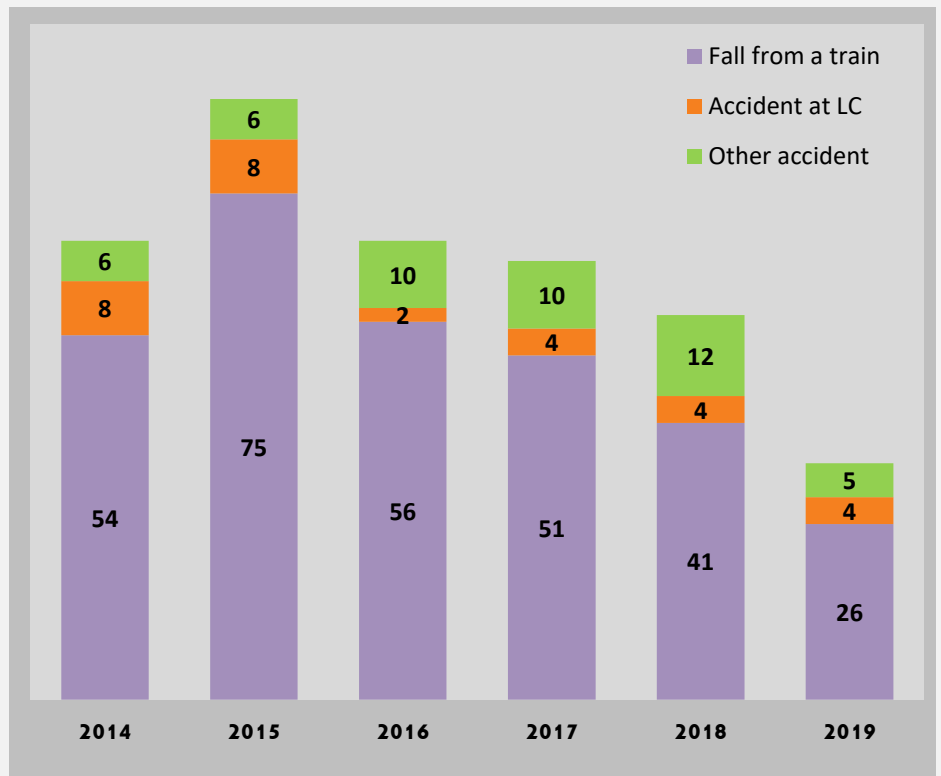




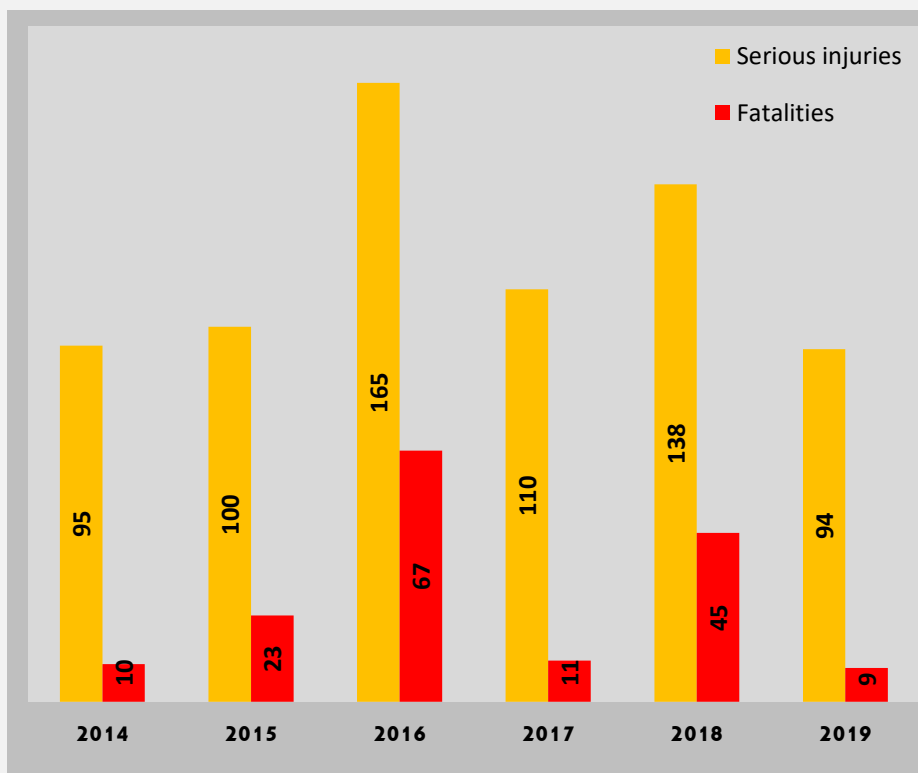
### 2.08a Accidents with passenger victims

The number of accidents with passenger victims decreases, since the peak of 2015. The figure obtained in 2019 (35 accidents) is the lowest observed since 2006.

74% of events with passenger victims are "individuals falling from a train", representing 26% of passenger victims.

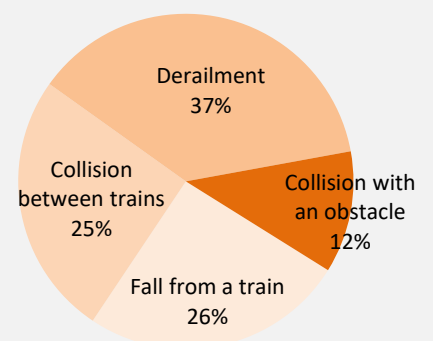


### 2.08b Passenger victims



The two accidents mentioned on page 2.07 are responsible for 55% of passenger victims.

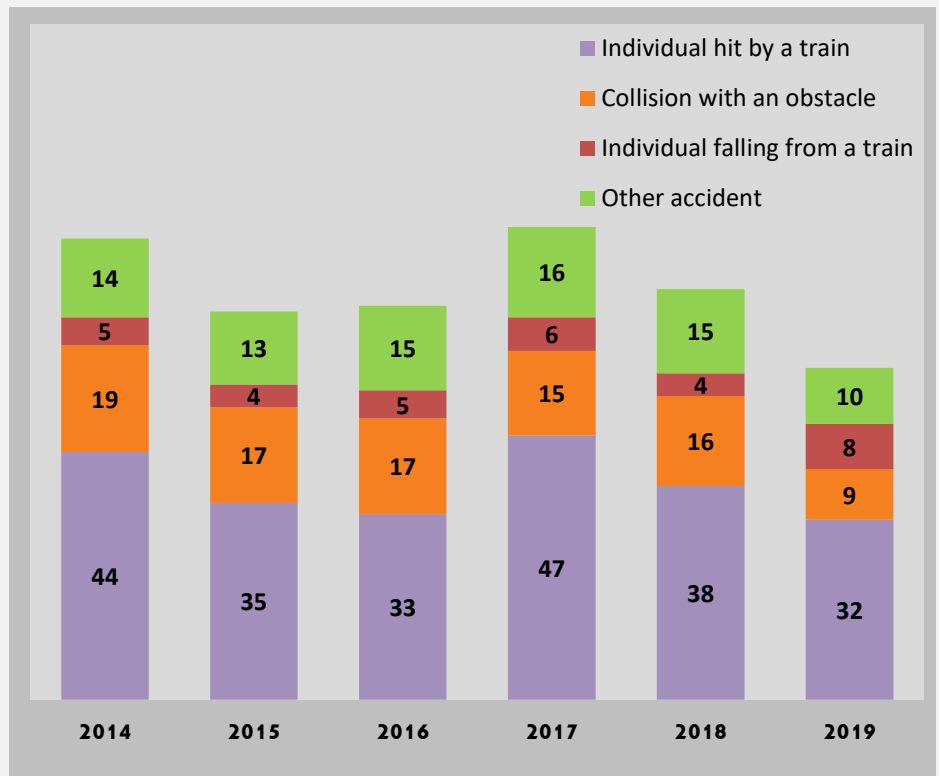
Split of passenger victims in 2019



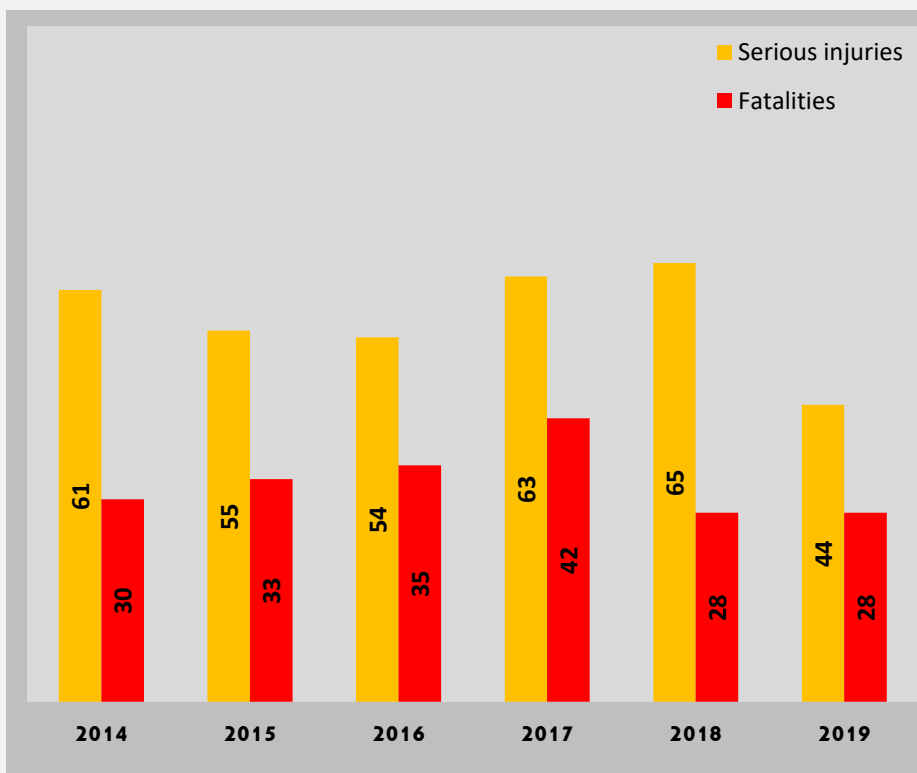
## 2.09a Accidents with staff victims

Trends are not obvious on this six-year period, but we should not forget that the number of accidents ten years ago was around 200, which means 2.5 higher than the present number.

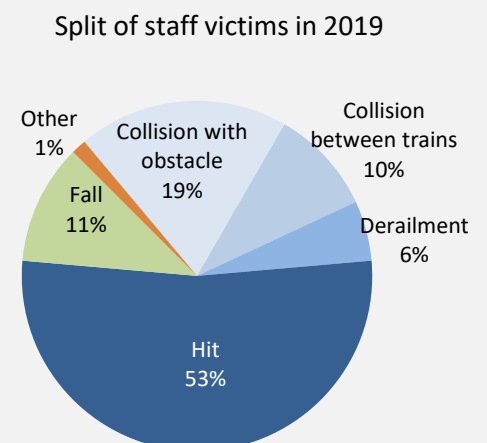
Rail infrastructure staff pays the heaviest price (54% of accidents are workers hit by a train).



## 2.09b Staff victims



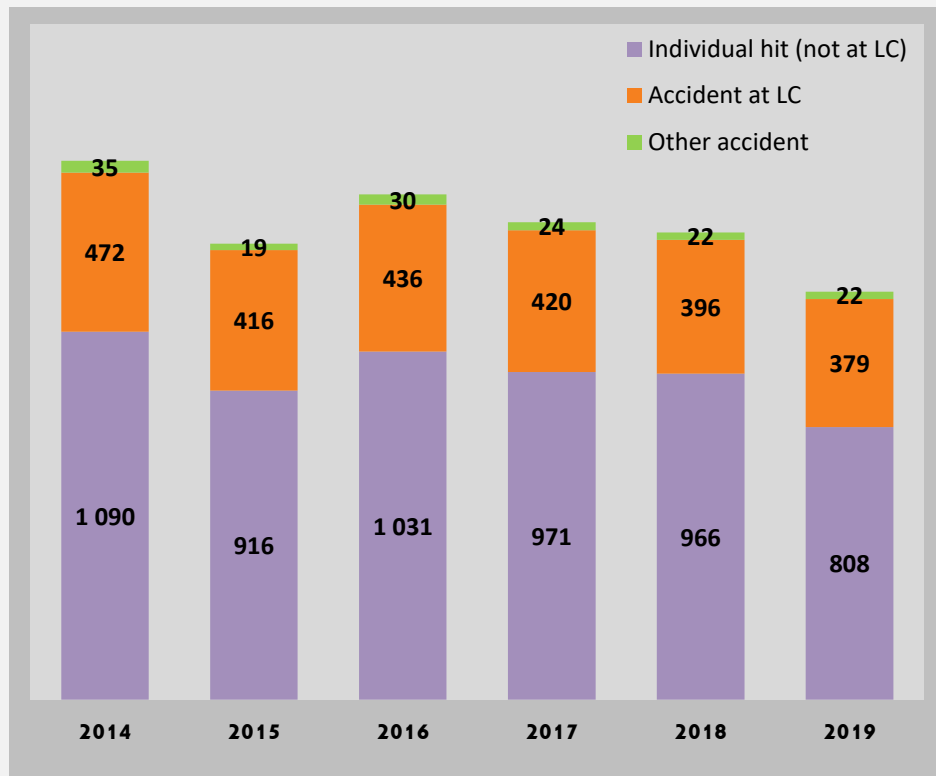
During the past five years, the number of staff victims stagnated around 90 persons. In 2019, it drops to 72 persons.



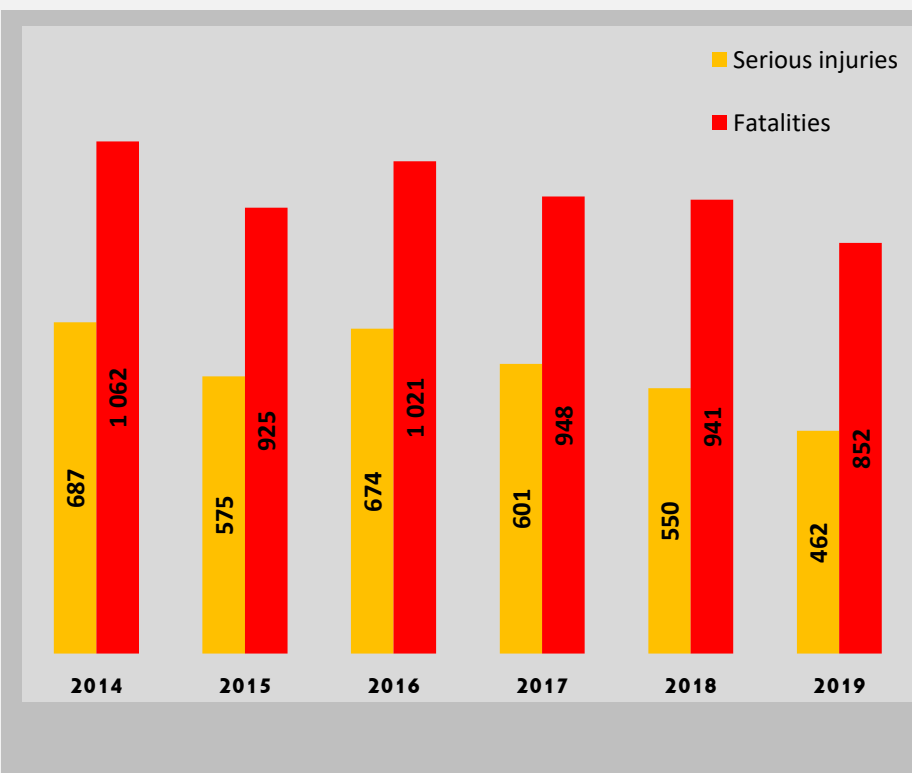
### 2.10a Accidents with third parties victims

The number of accidents with third parties victims decreased -24% since 2014.

These two types of accidents represented 98% of accidents with third parties victims in 2019.



### 2.10b Third parties victims



Fatalities decreased -19% from 2014 to 2019, whilst serious injuries decreased -33%.

Fatalities represent around 60% of all victims every year.

In 2019, most victims were trespassers (60%), followed by LC users (36%) and other third parties (4%), mostly pedestrians on public railway area (platforms).

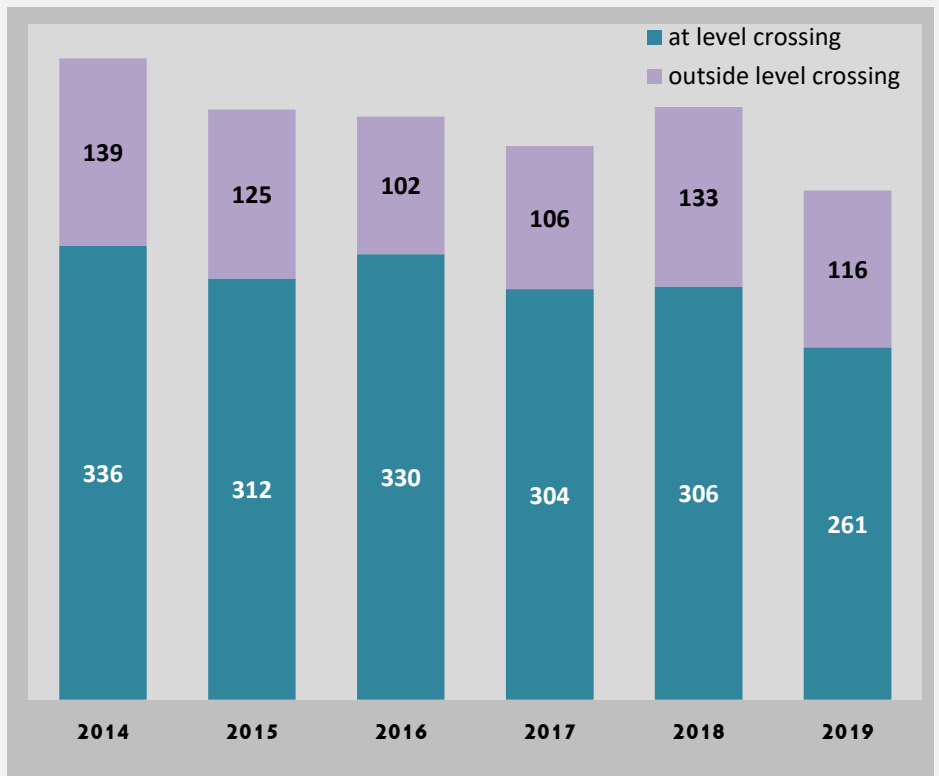
### 2.11a Collisions with an obstacle

This graph excludes shunting operations.

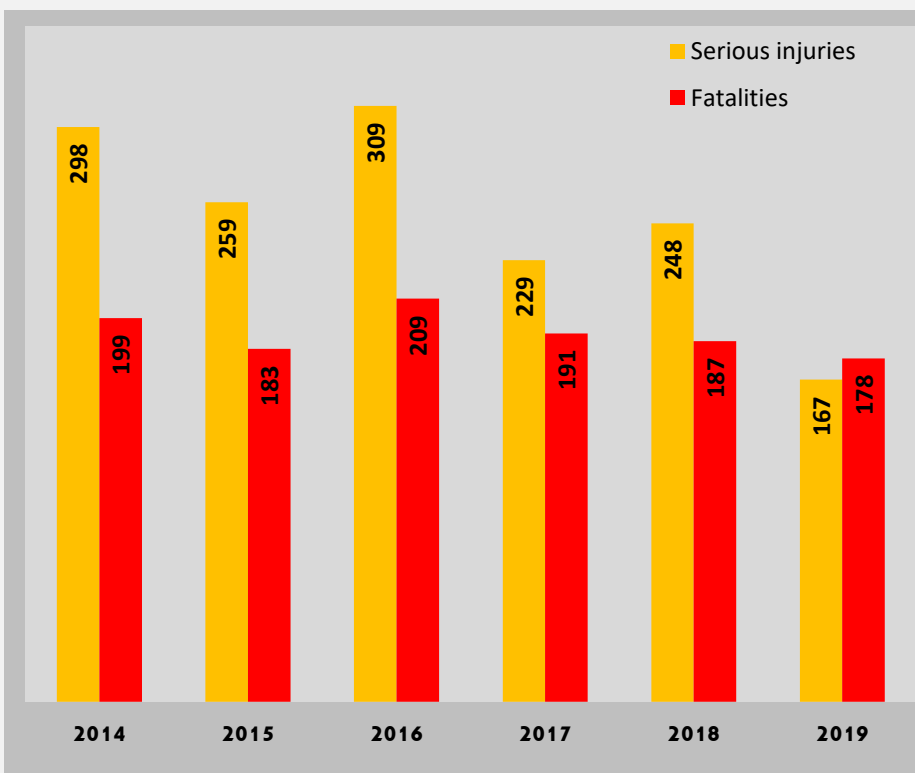
Collisions with an obstacle were stable from 2014 to 2018, then decreased -14% from 2018 to 2019.

This decrease is due to collisions at level crossing, which dropped -23% on the whole period.

70% of collisions with an obstacle occur at level crossings. See graph 2.16.



### 2.11b Victims of collisions with an obstacle



Collisions with an obstacle had fewer human consequences in 2019 than 2014:

⇒ 1.05 victim per event in 2014

⇒ 0.92 victim per event in 2019

The total number of victims decreased -31% on the period (fatalities: -11% and serious injuries: -44%).

In 2019, fatalities overtake serious injuries for the first time.

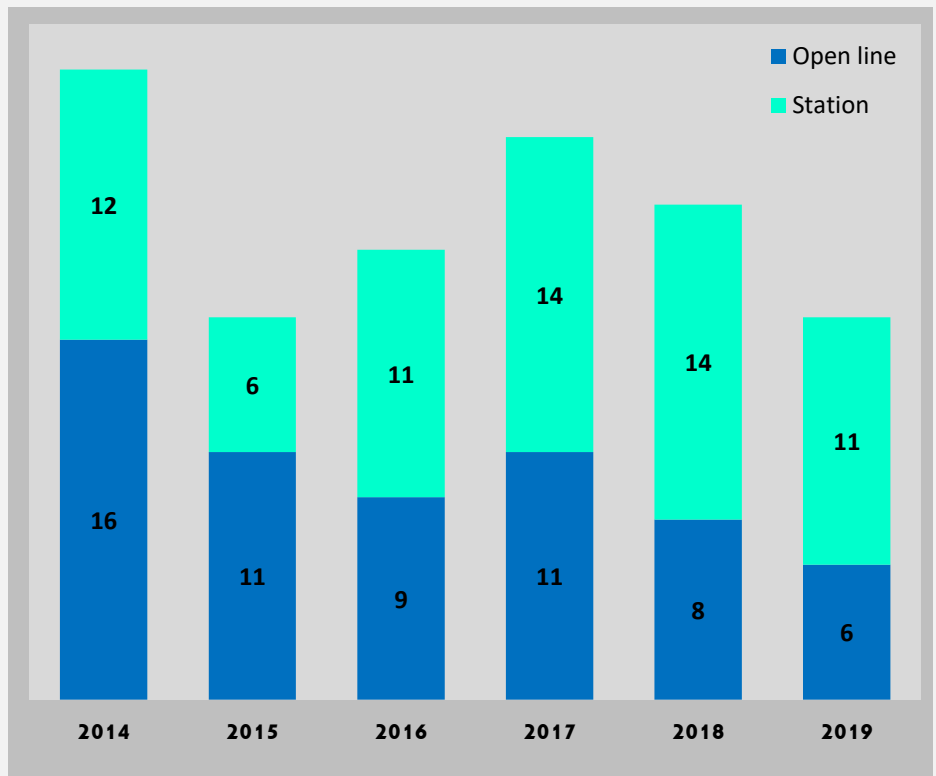
Level crossing users represent 94% of the 345 victims in 2019.

### 2.12a Collisions between trains

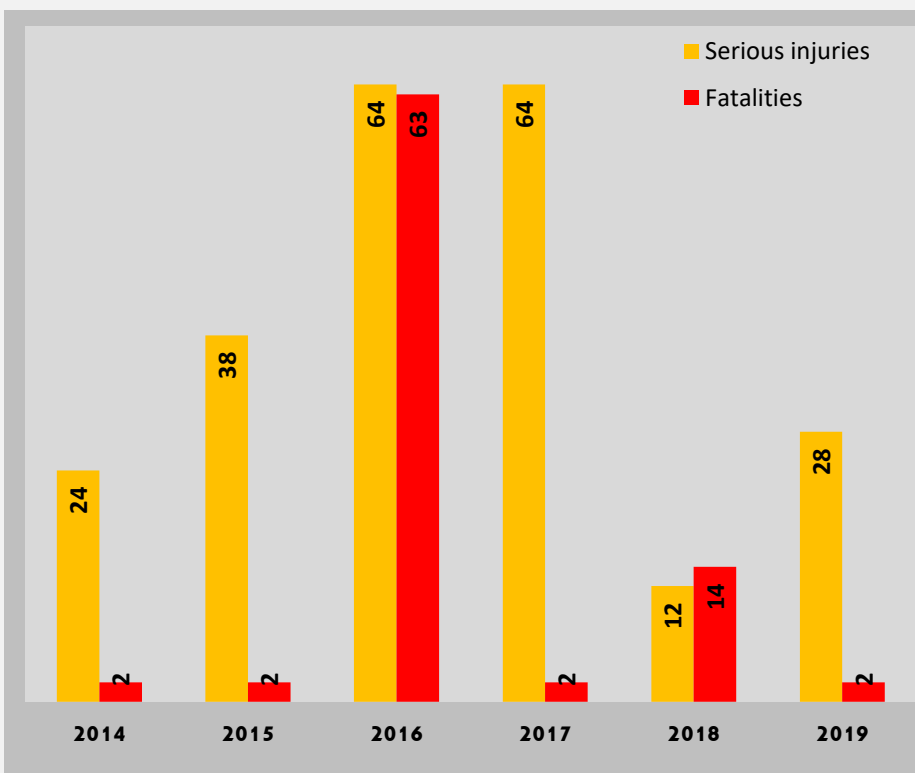
This graph excludes shunting operations.

Numbers are hopefully low. On another hand, they do not allow to determine trends. The number of collisions in 2019 is equal to 2015 and the lowest observed since 2006.

There is no correlation between the number of accidents and the number of victims. Few very severe accidents may lead to a large number of victims.



### 2.12b Victims of collisions between trains



Proportion of victims caused by the 2 most severe collisions each year:

2014	62%
2015	75%
2016	83%
2017	68%
2018	53%
2019	93%

On the whole period, 10 accidents led to 75% of accounted victims in collisions between trains.

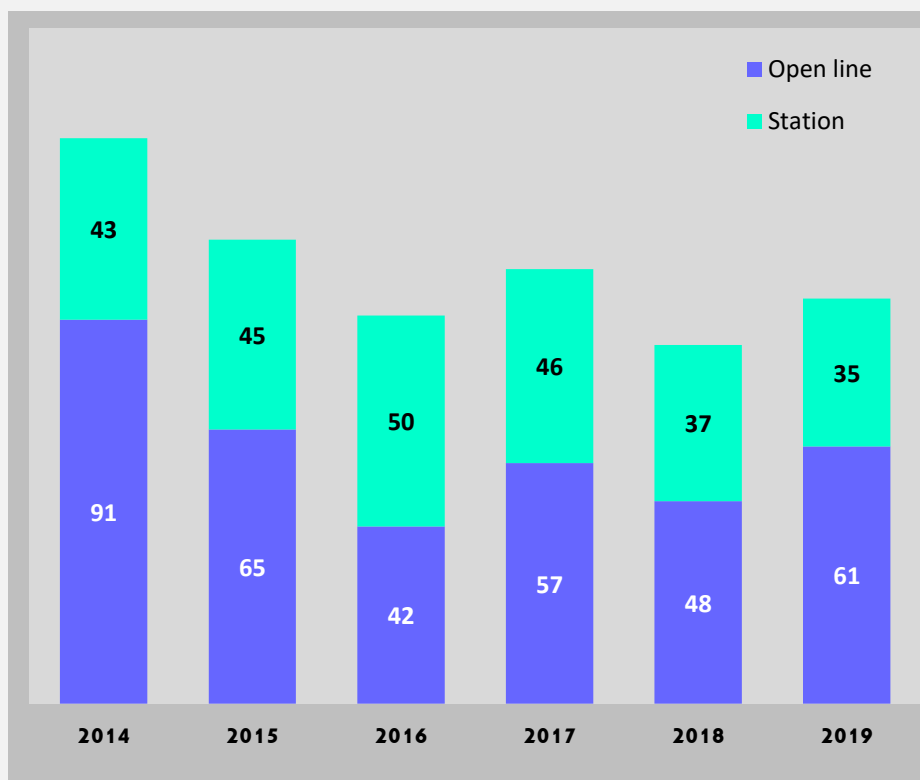
13 of the the 17 collisions occurred during 2019 had no human consequences.

### 2.13a Derailments

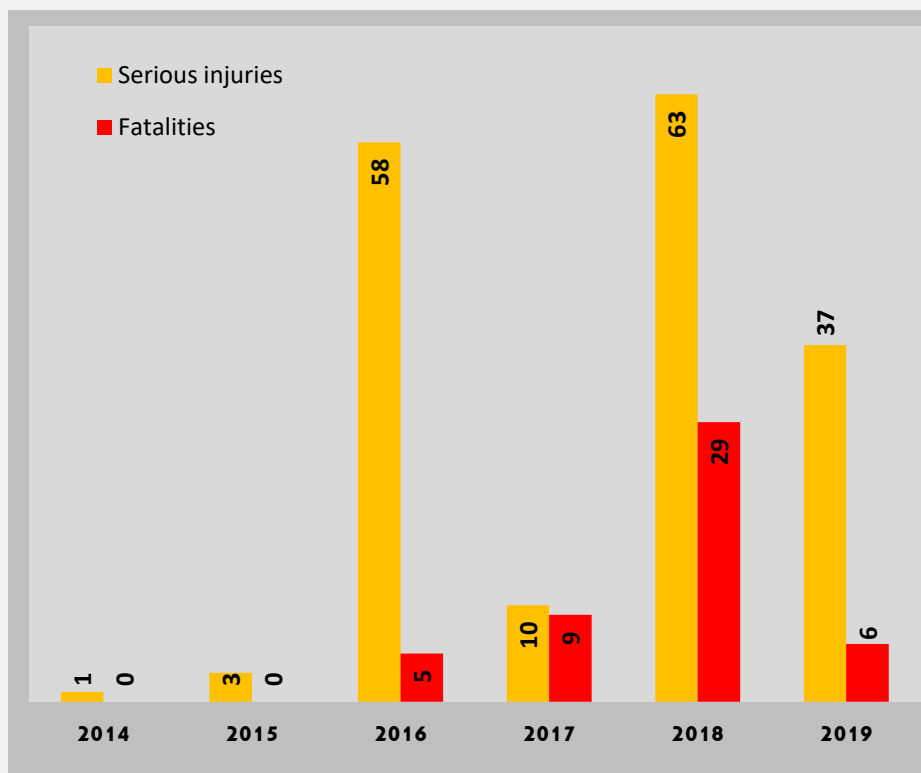
The number of derailments dropped between 2014 and 2015 and is relatively stable since then (around 100 per year). Derailments of freight trains decreased - 33% since 2014 whilst derailments of passenger trains decreased -5% only.

69% of derailments in the year 2019 concerned freight trains (against respectively 20% passenger trains and 11% infrastructure trains and other trains).

The graph excludes shunting operations (there were 21 derailments during shunting operations).



### 2.13b Victims of derailments



96% of all derailments during the period had no human consequences.

Four accidents generated 73% of all fatalities and 82% of all serious injuries.

12 accidents were fatal during the period, of which 2 occurred in 2019.

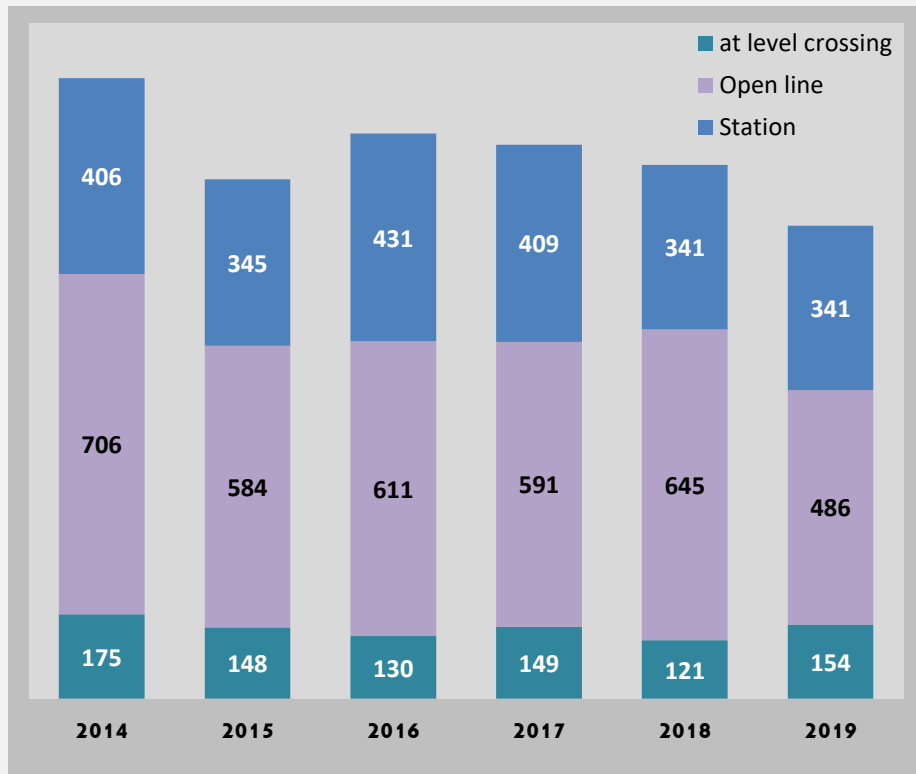
In 2019, 38 victims were passengers and 4 victims were railway employees.

### 2.14a Individuals hit by a train: accidents

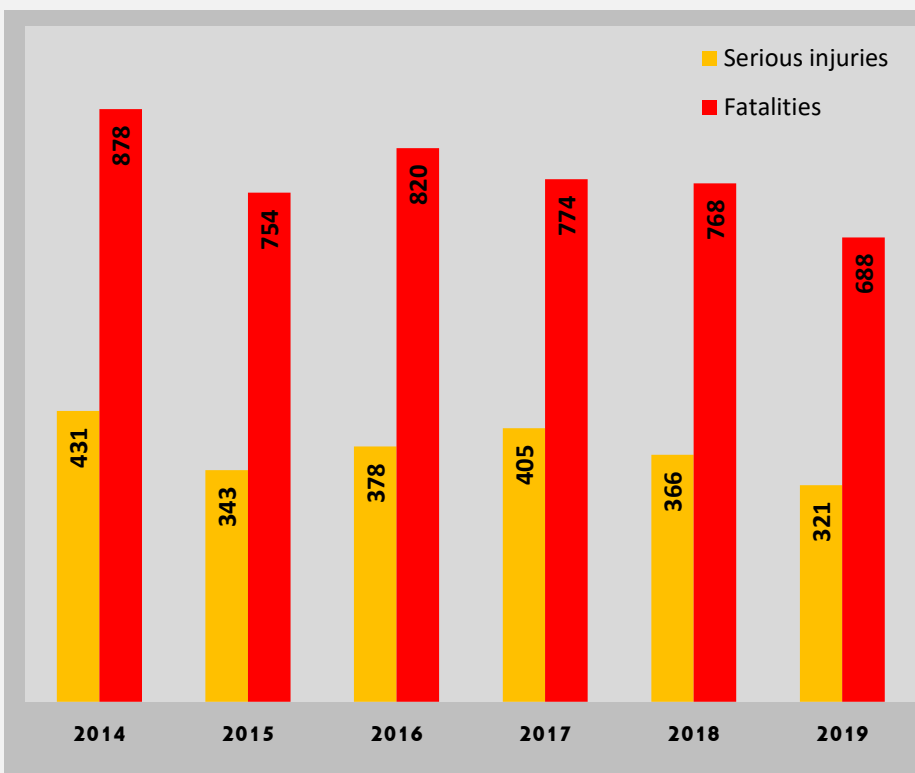
No real trend is observable regarding individuals hit by a train.

Pedestrians (or cyclists) hit by a train at level crossing represent between 11 % and 13% of this type of accident. This ratio is stable along the years till 2018. In 2019, it reaches 16%, due to a decrease of -15% of individuals hit outside level crossing.

The total number of individuals hit by a train during 2019 is the lowest number observed since 2006.



### 2.14b Individuals hit by a train: victims



Individuals being hit by a train is fatal in two thirds of events. This proportion remains equal along the years.

Split of victims in 2019:

- ⇒ Trespassers 75%
- ⇒ LC users 16%
- ⇒ Persons hit on platform 5%
- ⇒ Staff 3%

Split of accidents per number of victims in 2019:

- ⇒ 1 victim: 971 events (98%)
- ⇒ 2 victims: 18 events
- ⇒ 3 victims: 4 events

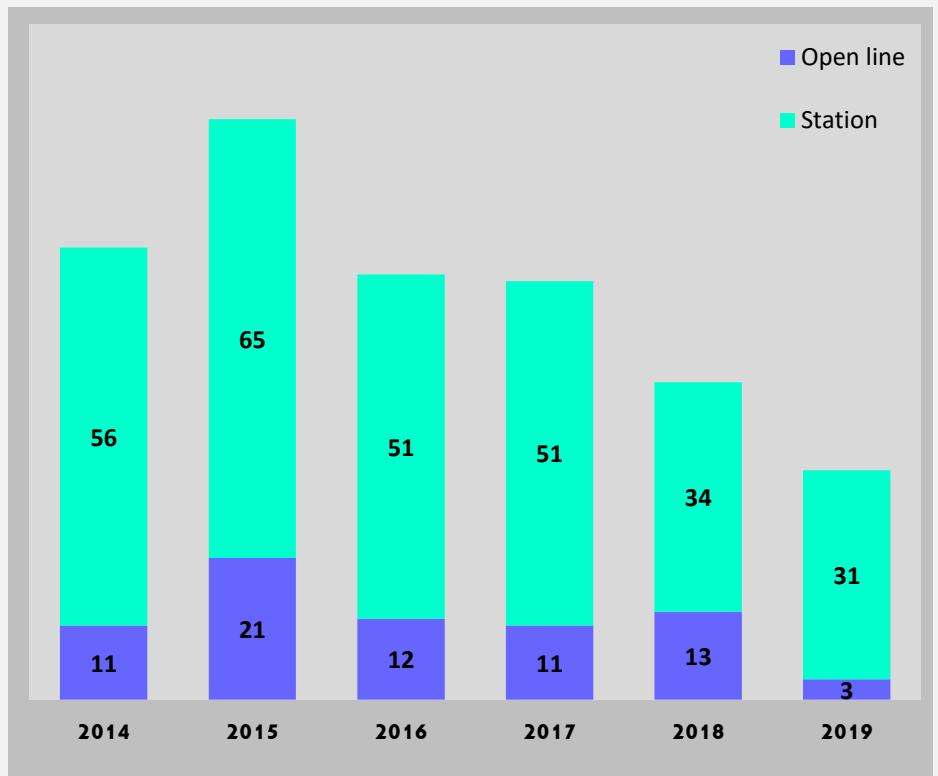
### 2.15a Individuals falling from a train: accidents

Individuals falling from a train are less and less common. This type of accident now represents 2% of all accidents (7% ten years ago).

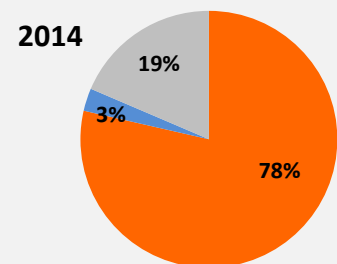
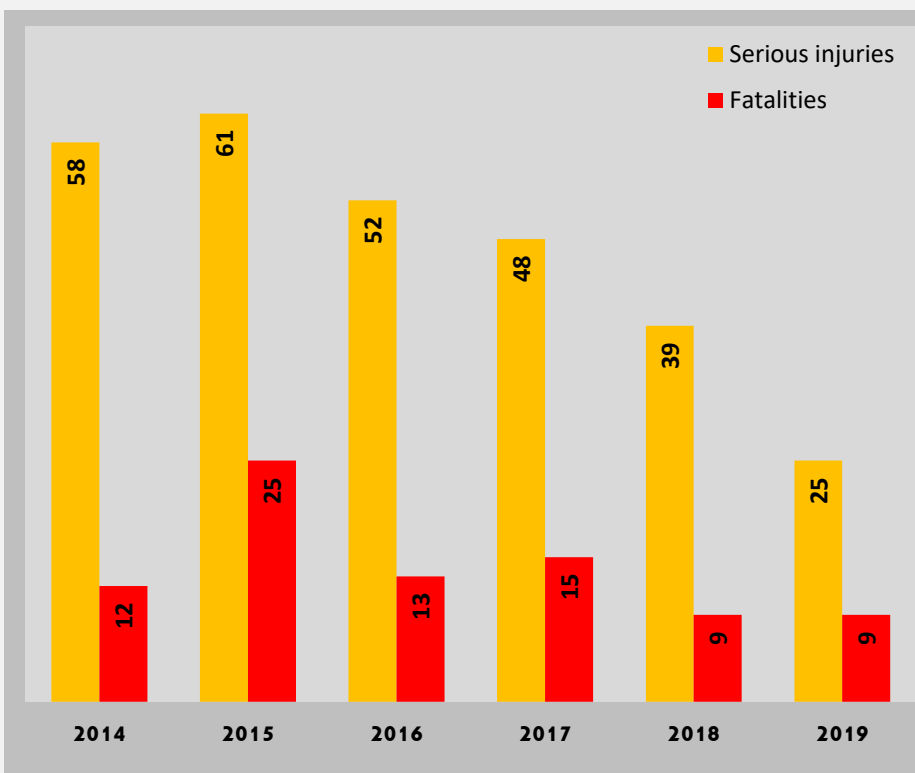
Most events occurred at station.

During the year 2019, passengers were involved in 26 cases, staff in 5 case and trespassers in 3 cases.

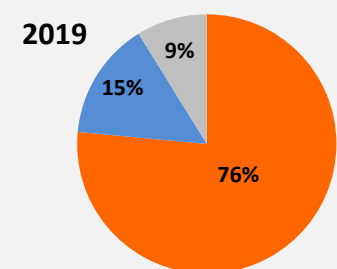
The graph excludes shunting operations.



### 2.15b Individuals falling from a train: victims



■ Passengers  
■ Staff  
■ Third parties





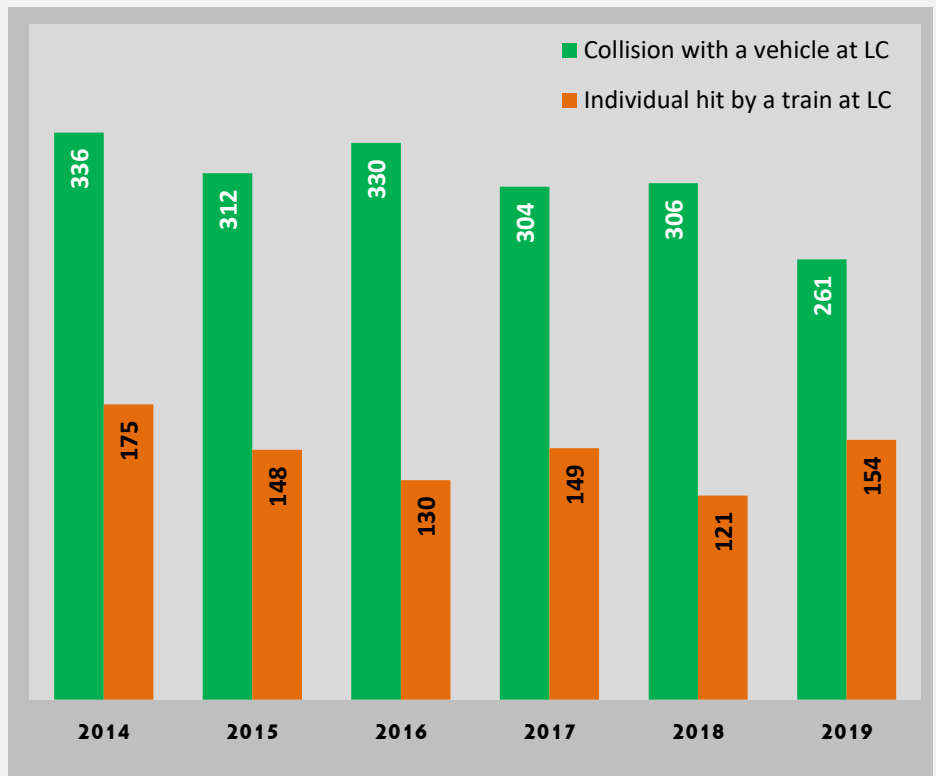
### 2.16a Accidents at level crossings

After 5 years of stability, the number of accidents at level crossing decreased slightly in 2019:

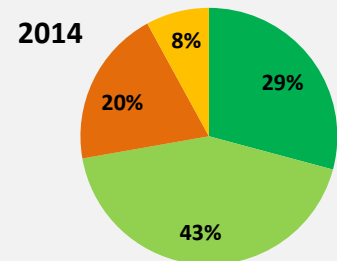
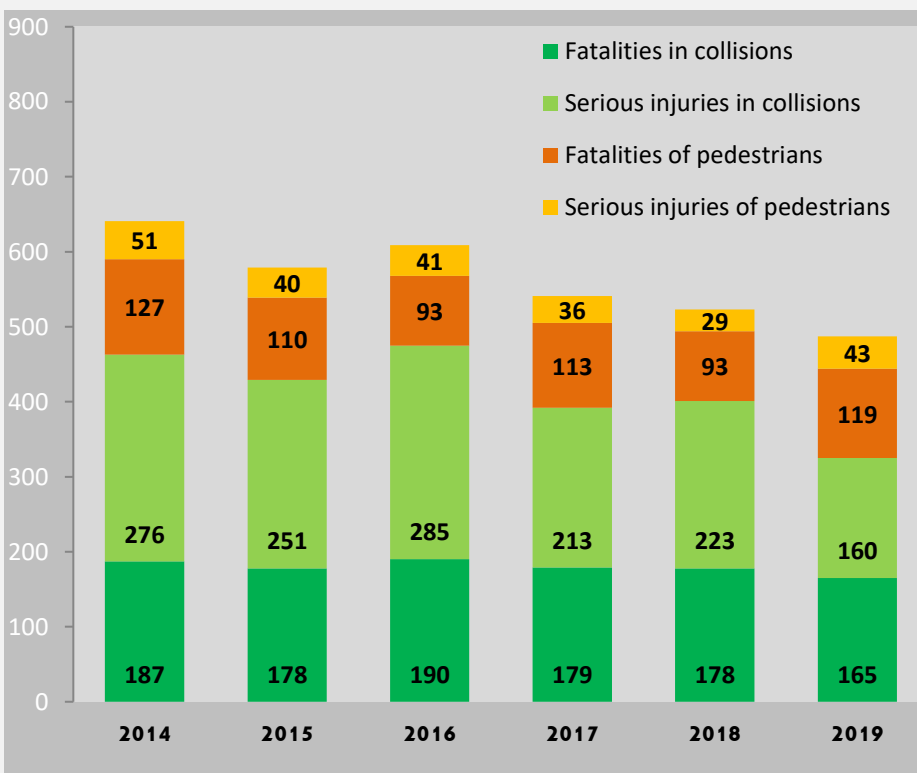
⇒ Collisions with a road vehicle decreased -23% on the whole period

⇒ Accidents involving pedestrians and cyclists decreased only -11% on the whole period

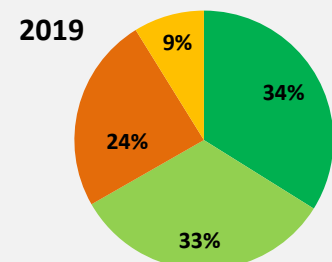
The split of victims shows a relative increase of fatalities in collisions (see graph below). Fatalities represent 58% of victims in 2019 (48% in 2014).



### 2.16b Victims of accidents at level crossings



■ Fatalities in collisions  
 ■ S. injuries in collisions  
 ■ Fatalities of pedestrians  
 ■ S. injuries of pedestrians



## Definitions from the Commission Directive 2016/798/EC ("Safety Directive")

**"Significant accident"** means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to stock, track, other installations or environment, or extensive disruptions to traffic, excluding accidents in workshops, warehouses and depots.

**"Significant damage to stock, track, other installations or environment"** means damage that is equivalent to EUR 150 000 or more.

**"Extensive disruptions to traffic"** means that train services on a main railway line are suspended for six hours or more.

## UIC Safety Database

Report 2020

Significant Accidents 2019

Report available on the UIC website

<http://safetydb.uic.org>



Contact

**Olivier Georger**

UIC Safety Unit

International Union of Railways

16 rue Jean Rey - F-75015 Paris

[georger@uic.org](mailto:georger@uic.org)

[www.uic.org](http://www.uic.org)

INTERNATIONAL UNION OF RAILWAYS  
16, rue Jean Rey - 75015 Paris - France  
Tel. +33 (0)1 44 49 20 20  
Fax +33 (0)1 44 49 20 29  
Email: [info@uic.org](mailto:info@uic.org)

Published by: UIC - Safety Unit  
Director of publication: Olivier Georger  
Cover and layout: Ludovic Wattignies  
Photo credit: Adobe Stock  
Printing: UIC

ISBN 978-2-7461-2998-6  
Copyright deposit: September 2020

[www.uic.org](http://www.uic.org)



#UICrail

