UIC Safety Report

2019

Significant Accidents 2018

Public Report

Department of
Fundamental Values

Safety Unit

October 2019

INTERNATIONAL UNION
OF RAILWAYS

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UIC Safety Report
2019

Significant Accidents occurred in Europe during the year 2018

Public Report

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Foreword

This is the 13th edition of the UIC Safety Report. We are very pleased to announce the participation of three new railway companies, namely OSE from Greece (data provided by RAS-EL), KRNA from South Korea (data provided by KRRI) and RŽD from Russia.

After having taken the initiative to open the Safety database to companies outside Europe, UIC sees for the second time three new members joining this work. Some more companies are preparing to join in the near future. Should this trend continue, we might see the Safety Database grow into a worldwide tool for benchmarking safety in the railway sector. I consider this a very positive development.

Let us not forget that 90% of railway accidents are caused by third parties, mostly trespassers and level crossing users crossing at the wrong time. These are the accidents whose number is hardest to reduce, and which the railways cannot eliminate alone. Society as a whole needs to be educated about risk, starting with public authorities.

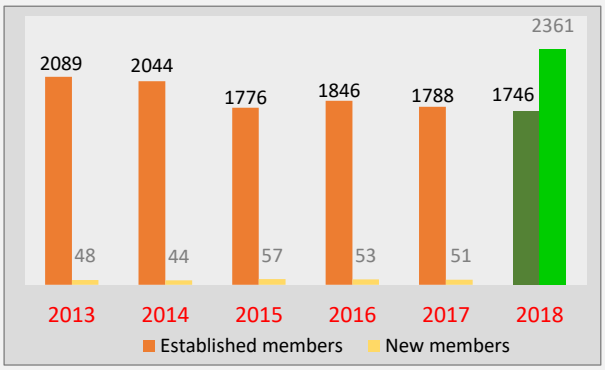
Jerzy WISNIEWSKI

Manager of the UIC-Fundamental Values Department

Executive summary

Number of significant accidents

The number of significant accidents declared by established members in 2018 (1746) is somewhat lower than the three previous years (1776, 1846 and 1788). This means a consolidation of the general improvement of railway safety over the past 10 years. 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 member is comparable.



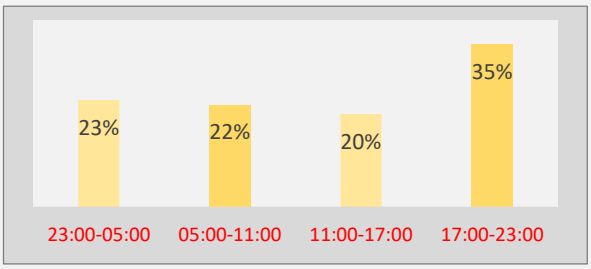
Number of fatalities

21 more fatalities were recorded in 2018 than in the previous year for the established members. Regarding the types of accidents the railway sector can influence most directly (train collisions, derailments, fires and shunting operations), we observe 29 fatalities in 2017 and 53 in 2016. This difference of 24 fatalities was the result of three major accidents: a train derailment in Italy (3 fatalities and 34 serious injuries) and a train derailment in Turkey (25 fatalities and 25 serious injuries), both caused by track deformation and a train collision with a tractor and trailer on a level crossing (2 fatalities and 20 serious injuries), caused by the slow movement of the tractor.

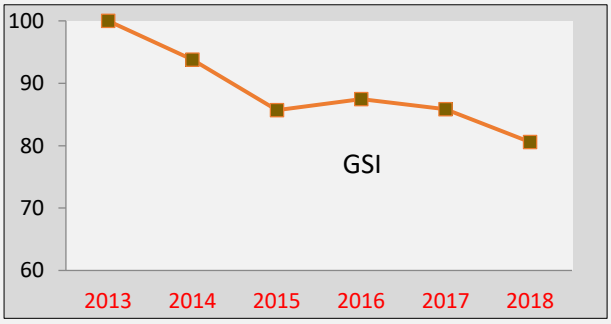
Fatalities	2017	2018	*Diff.*
Individual hit by train or falling from a train (outside LC)	685	700	*15*
Level crossing accidents	287	269	*-18*
Other accidents (train collisions, derailments, fires and shunting operations)	29	53	*24*
Total	**1001**	**1022**	***21***

Individuals hit by train in stations

This year's special topic reveals two remarkable observations apart from the fact that since 2013 we see no upward or downward trend. We do see that there are more accidents recorded in the last quarter of the year, in the later evening hours and on the weekends.



UIC Global Safety index (all railways but RZD)



The UIC Global 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 2013 to 2015 is followed by three level years. 2018 seems to be picking the long term improvement of general safety level.

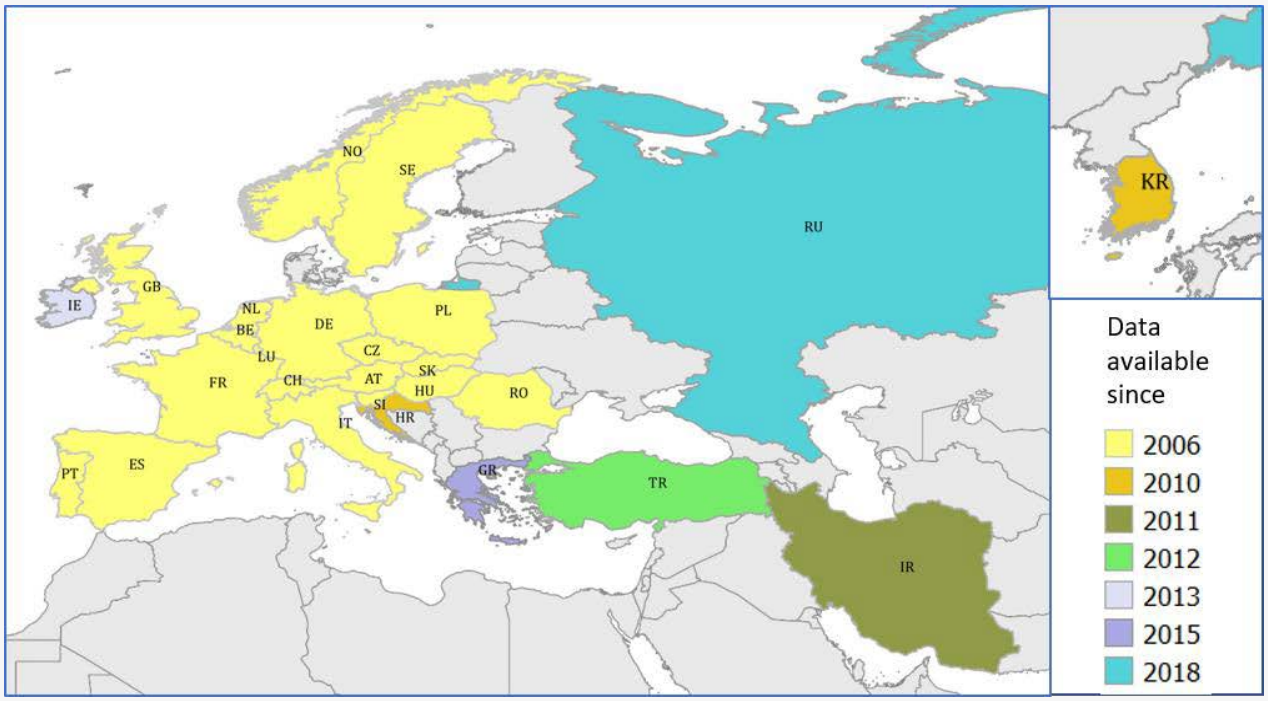
Bart Hoogcarspel
Chairman of Safety Performance Group

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 [2]	Germany	DE
HZ	Croatia	HR
Infrabel [2]	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 [1]	Netherlands	NL
RAI	Iran	IR
RFI	Italy	IT
RSSB [2]	United Kingdom	GB
RŽD	Russia	RU
SBB CFF FFS [2]	Switzerland	CH
SNCF Réseau [2]	France	FR
SŽ	Slovenia	SI
SŽDC	Czechia	CZ
TCDD	Turkey	TR
Trafikverket [2]	Sweden	SE
ŽSR	Slovakia	SK

[1] Chair and [2] Members of the Safety Performance Group



Part 1

General Safety Indicators

Part 1 - General Safety Indicators

1.01 Evolution of significant accidents and UIC Global Safety Index

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

1.03 Main causes of accidents in the year 2018

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

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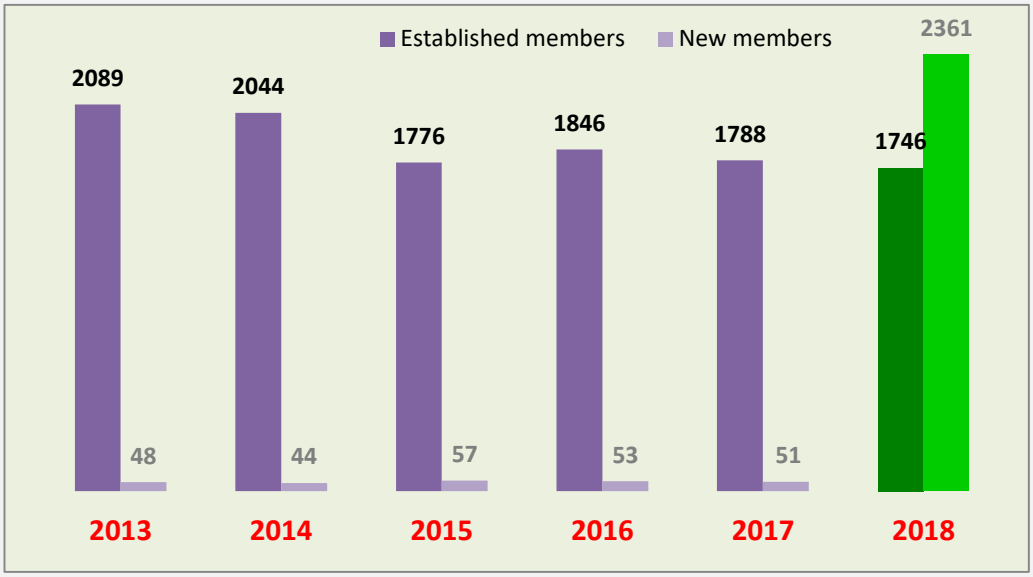
1.16 UIC Global Safety Index

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 Global Safety Index

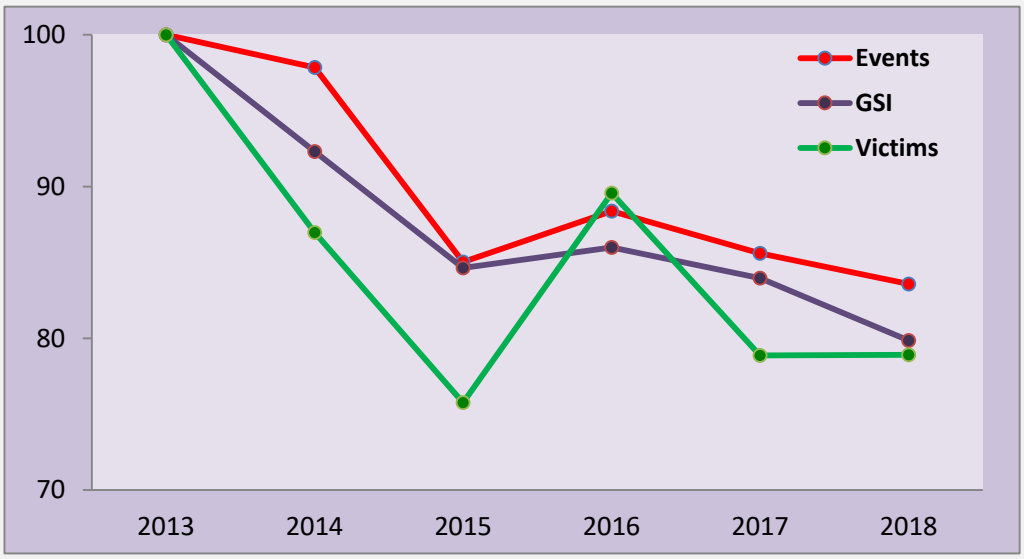


"Significant accident" means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to stock, track, other installations or environment, or extensive disruptions to traffic, excluding accidents in workshops, warehouses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

The UIC Safety Database hosts this year three new members depicted in light colour on the graph above.

Country	*Data provider*	*Period*
South Korea	Korean rail Research Institute (KRRI)	2010 - 2018
Greece	Rail Regulatory Authority (RAS-EL)	2015 - 2018
Russia	JSC Russian Railways (RŽD)	2018

The number of events at Established members observed in 2018 a decrease of -2.5% compared to 2017 and -9% to the average on the period 2013-2017. 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 2013) for Established members.



1.02 Types of accidents according to UIC-SDB and EU definitions (including Russia)

<table>
<tr><th colspan="2">Types of accidents as defined in UIC – SDB</th><th colspan="2">Additional information from UIC -SDB</th><th colspan="2">Types of accidents as defined in EU Safety Directive</th></tr>
<tr><td>2,5%</td><td colspan="3">Derailment of trains</td><td>2,5%</td><td>Derailment of trains</td></tr>
<tr><td>0,5%</td><td colspan="3">Train collision with another train</td><td>0,5%</td><td>Train collision with another train</td></tr>
<tr><td rowspan="2">11,9%</td><td rowspan="2">Train collision with an obstacle</td><td>3,2%</td><td>Train collision with an obstacle not at LC</td><td>3,2%</td><td>Train collision with an obstacle not at LC</td></tr>
<tr><td>8,7%</td><td>Train collision with an obstacle at LC</td><td rowspan="2">14,7%</td><td rowspan="2">LC accidents, including accidents involving pedestrians at LC</td></tr>
<tr><td rowspan="2">80,9%</td><td rowspan="2">Individual hit by a train</td><td>5,9%</td><td>Individual hit by a train at LC</td></tr>
<tr><td>75,0%</td><td>Individual hit by a train not at LC</td><td rowspan="2">76,1%</td><td rowspan="2">Accidents to persons caused by rolling stock in motion, with the exception of suicides.</td></tr>
<tr><td>1,2%</td><td colspan="3">Individual falling from a train</td></tr>
<tr><td>0,6%</td><td colspan="3">Fire in rolling stock</td><td>0,6%</td><td>Fire in rolling stock</td></tr>
<tr><td>0,1%</td><td colspan="3">Electrocution by overhead line or third rail</td><td rowspan="4">2,4%</td><td rowspan="4">Other types of accidents</td></tr>
<tr><td>0,0%</td><td colspan="3">Accident involving dangerous goods</td></tr>
<tr><td>2,3%</td><td colspan="3">Shunting operations</td></tr>
<tr><td>0,0%</td><td colspan="3">Runaway vehicles</td></tr>
</table>

- 82% of accidents involved individuals hit by a train or falling from a train.
- Collision with an obstacle was the second most common accident (12% of all accidents).
- Accidents at level crossings accounted for 15% of all significant accidents.
- Accidents during shunting operations and involving runaway vehicles are now 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

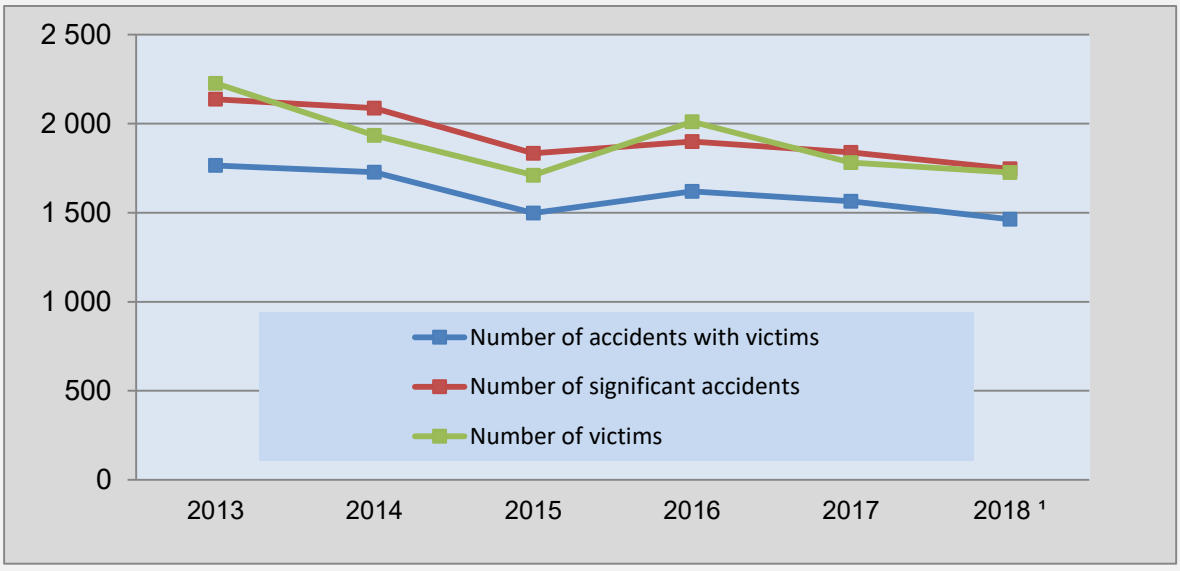
2018	Causes at first level	Causes at second level	
EXTERNAL CAUSES	THIRD PARTIES	Trespassing	73,8%
		Vehicle (LC accident)	8,7%
		Pedestrian (LC accident)	6,1%
	90,5%	Pedestrian on public railway area	1,4%
		Other or not specified	0,5%
92,2%	WEATHER & ENVIRONMENT	Environment	1,3%
	1,7%	Weather	0,3%
INTERNAL CAUSES	INFRASTRUCTURES	Tracks and structures	0,7%
		Energy system	0,4%
	1,4%	Other or not specified	0,4%
	ROLLING STOCK	Running gear	0,3%
	1,4%	Other or not specified	1,1%
	HUMAN FACTORS (Railway staff & subcontractors)	Track and switch maintenance staff	0,5%
		Traffic operating and signalling staff	0,6%
		Train drivers	0,7%
	3,6%	Other or not specified	1,8%
7,4%	RAILWAY USERS	Passengers	1,0%
	1,0%	Other or not specified	0,0%
CAUSES NOT IDENTIFIED			0,5%

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

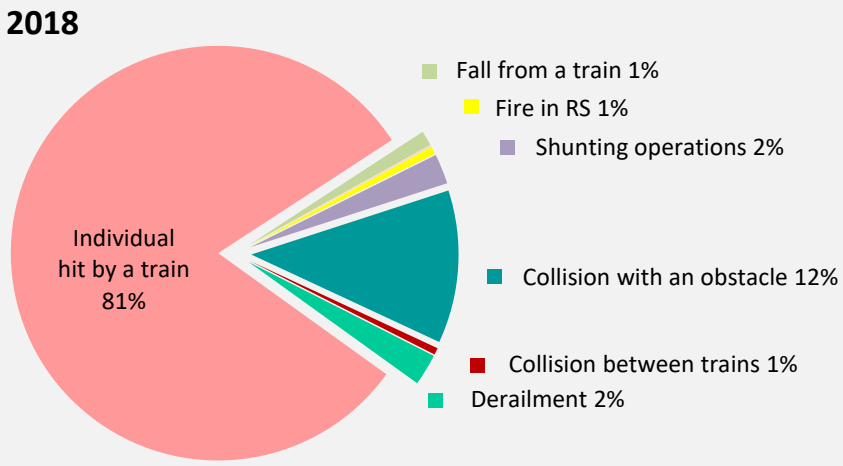
1.04 Trend of accidents and rates over the last six years

ALL RAILWAYS	2013	2014	2015	2016	2017	2018 [1]	2018 [2]
Number of significant accidents	2 137	2 088	1 833	1 899	1 839	1 746	4 107
Significant accidents per million train-km	0,49	0,48	0,42	0,43	0,40	0,39	0,66
Number of accidents with victims	1 765	1 728	1 498	1 619	1 564	1 463	3 802
Accidents with victims per million train-km	0,41	0,40	0,34	0,36	0,34	0,33	0,61
Number of victims	2 227	1 935	1 711	2 011	1 782	1 725	4 184
Victims per million train-km	0,51	0,44	0,39	0,45	0,39	0,39	0,67
Number of fatalities	1 214	1 097	980	1 121	1 008	985	2 626
Fatalities per million train-km	0,28	0,25	0,22	0,25	0,22	0,22	0,42
Number of million train-kilometres	4 345	4 371	4 399	4 445	4 551	4 437	6 207

[1] established members [2] all members

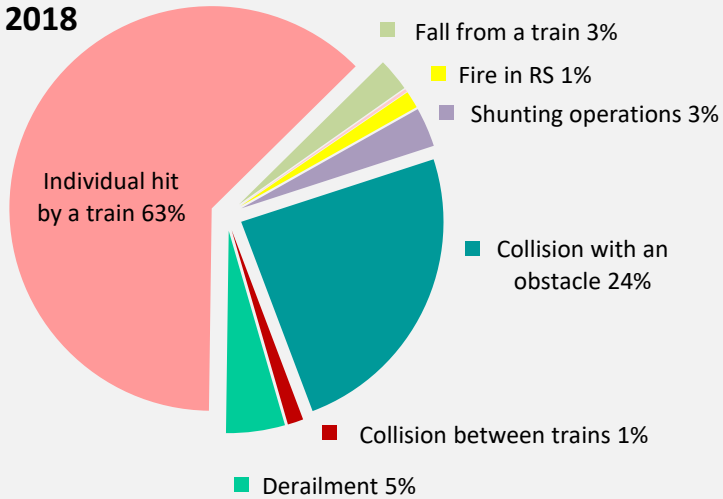


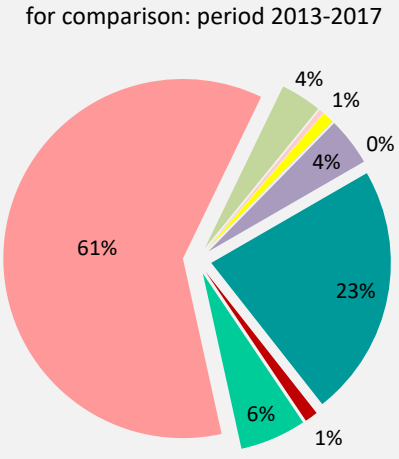
1.05 Accidents by type



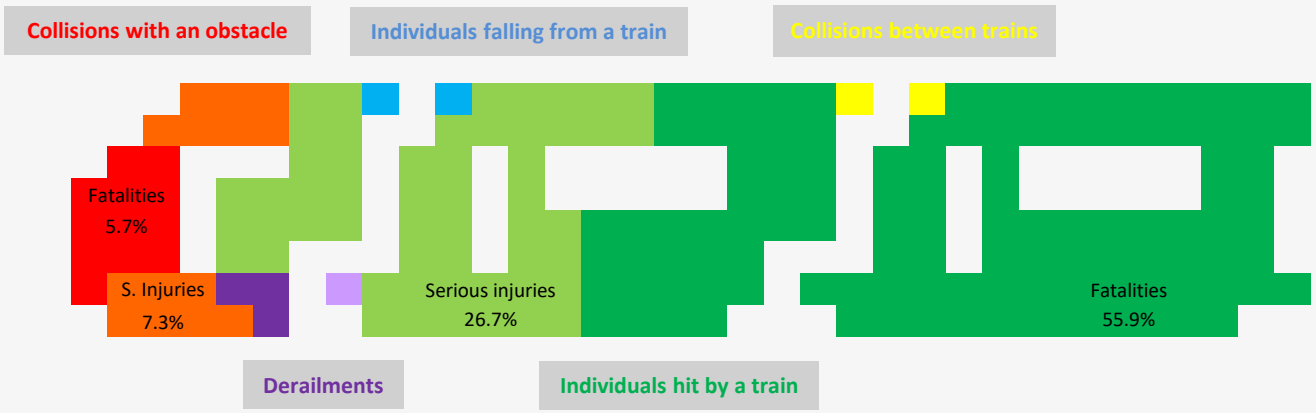
- "Collision with an obstacle" includes collisions at LC.
- "Individual hit by a train" includes pedestrians at LC.
- For LC accidents, refer to graph 1.10.

Split of accidents inside the perimeter of Established members

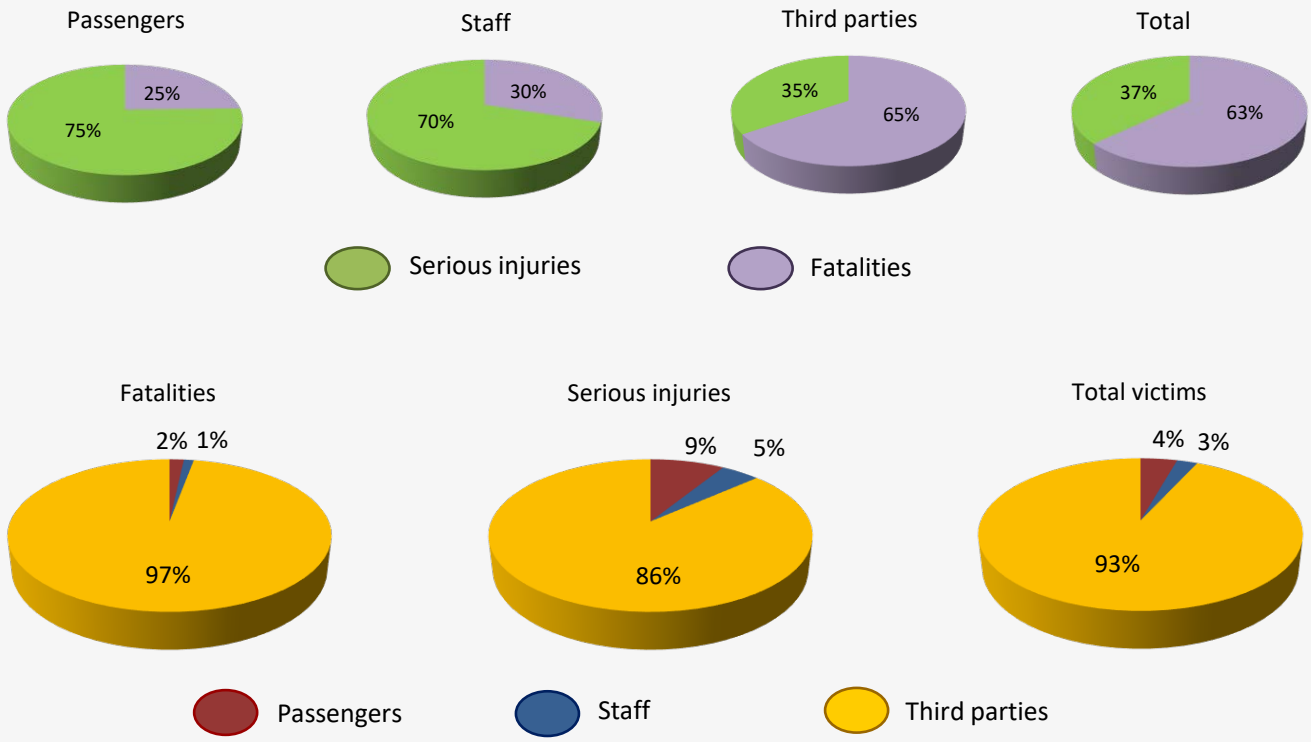




1.06 Fatalities and serious injuries by type of accident



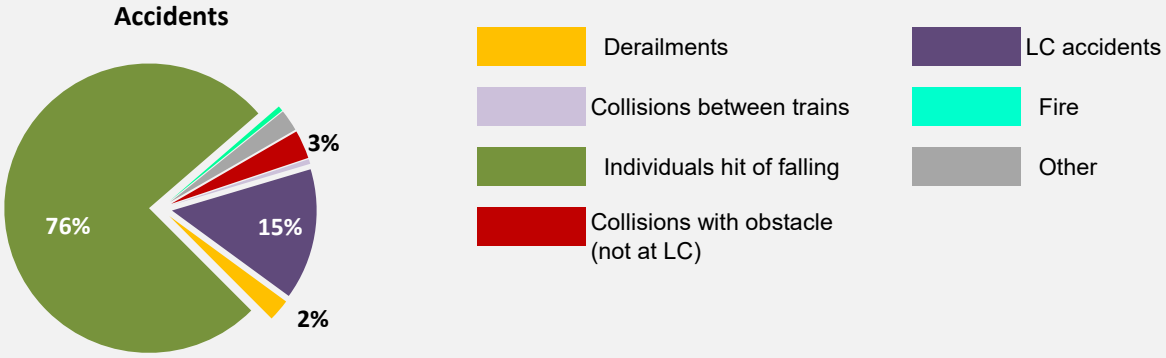
1.07 Distribution of victims

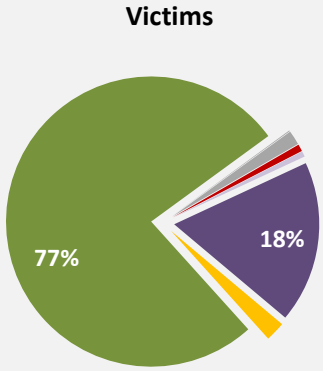


Reading method: fatalities account for 25% of passenger victims and passengers represent 2% of fatalities.

- Third parties represented 97% of all fatalities and 86% of serious injuries.
- Passengers accounted for 4% of all victims.

1.08 Victims by type of accident according to Safety Directive definitions

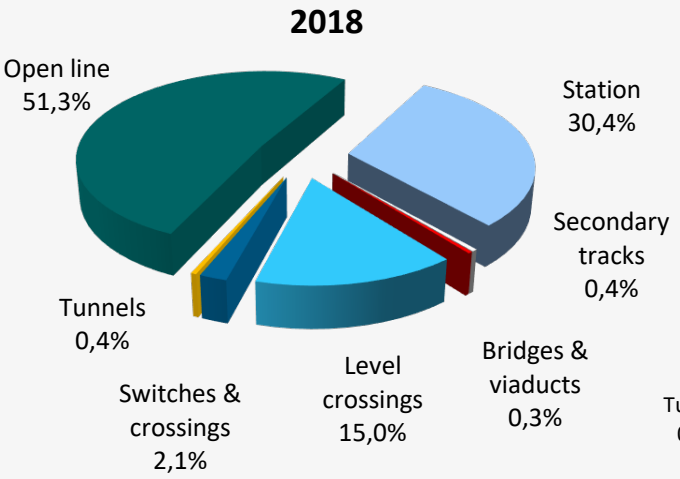




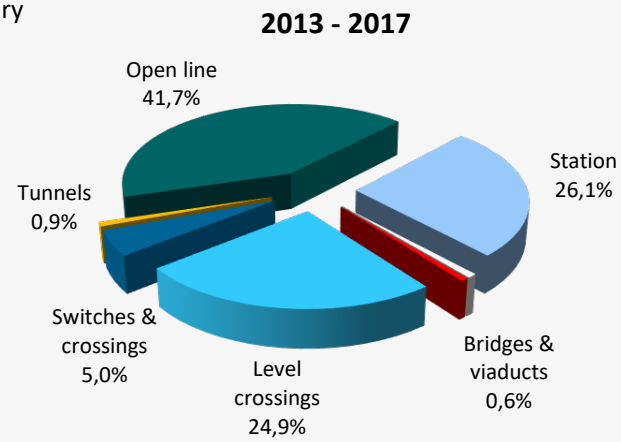
Breakdown of human consequences			
	Fatal.	Injur.	All
Passengers	1,1%	3,3%	**4%**
Staff	0,7%	1,7%	**2%**
Third parties	60,9%	32,2%	**93%**
All categories	**63%**	**37%**	**100%**

Type of accident	Number of events	%	Fatalities			Serious injuries		
			Passengers	Staff	3rd parties	Passengers	Staff	3rd parties
Collisions with obstacle (not at LC)	131	*3,2%*	1	-	7	10	9	6
Collisions between trains	22	*0,5%*	8	6	-	5	7	-
Level crossings	602	*14,7%*	-	2	413	29	14	297
Derailment	101	*2,5%*	28	1	-	60	3	-
Individuals & rolling stock in motion (not at LC)	3 127	*76,1%*	8	17	2108	32	22	1020
Fire	24	*0,6%*	-	-	-	1	3	-
Other types	100	*2,4%*	-	5	22	1	14	25
Total	**4 107**		**45**	**31**	**2 550**	**138**	**72**	**1 348**

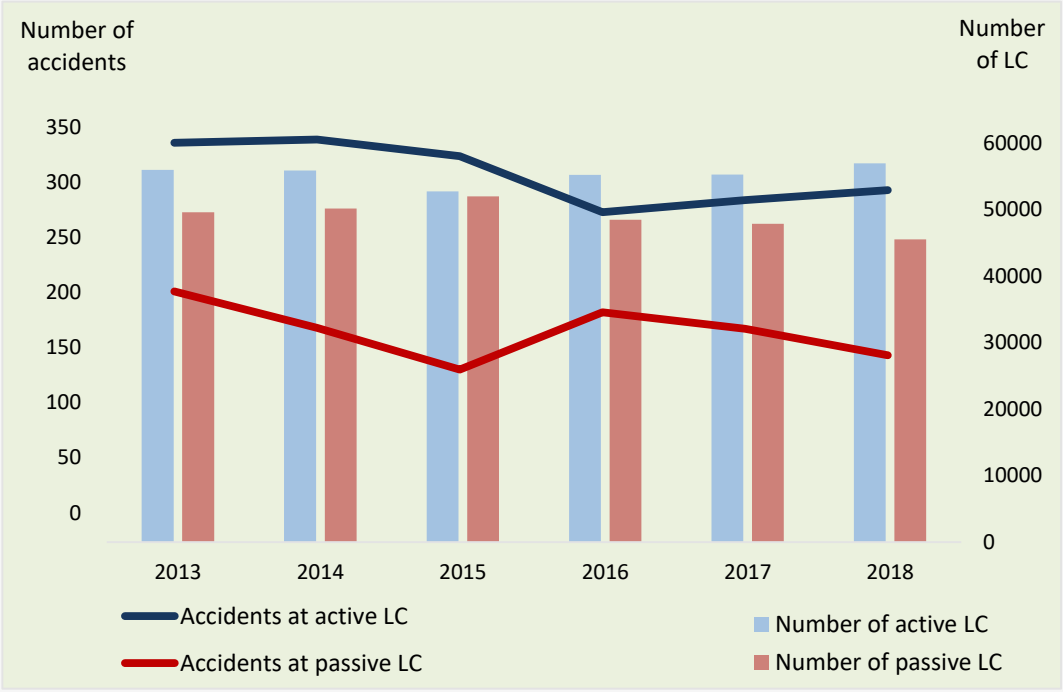
1.09 Accidents by location details



Note: Secondary tracks as a location detail was introduced in 2016.



1.10 Accidents at level crossings (excluding Russia)



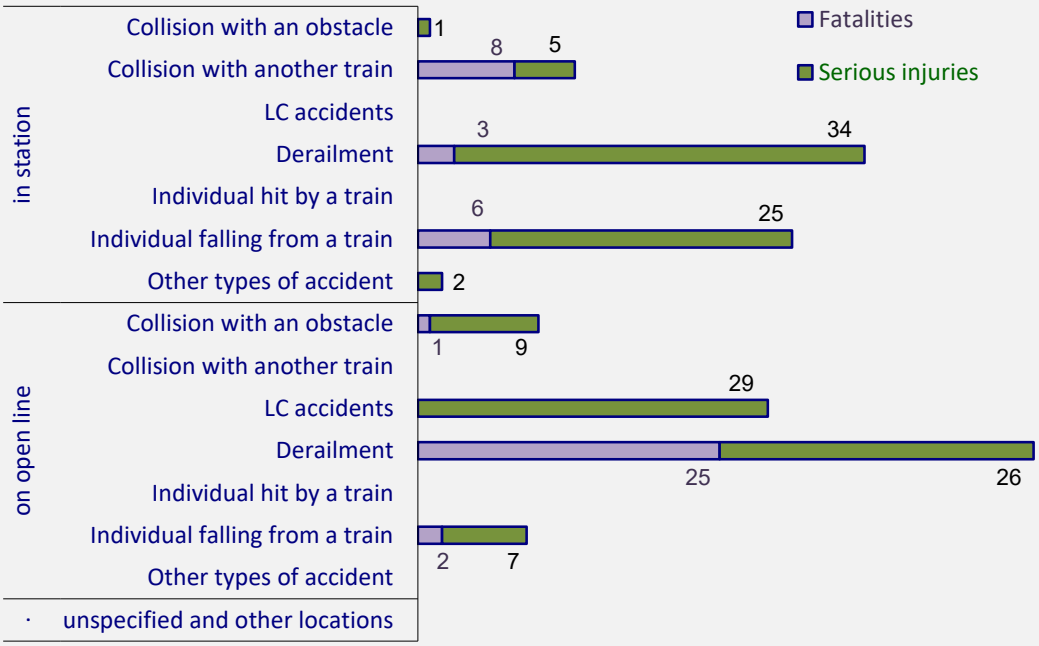
Accidents at passive level crossing decrease along with the decrease of the number of passive level crossings. Accidents at active level crossings increased on the last two years.

1.11 Number of accidents and victims by type of accident

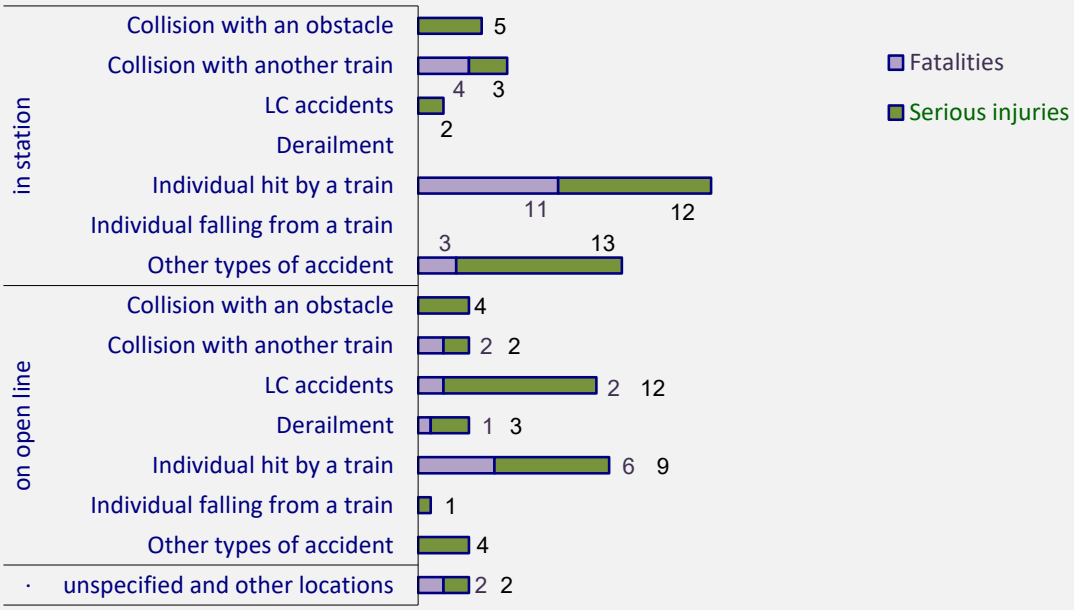
2018		Number of accidents	FATALITIES			SERIOUS INJURIES			ALL VICTIMS
			Passengers	Staff	3rd parties	Passengers	Staff	3rd parties	
At station	Collisions with an obstacle (not at LC)	26	-	-	1	1	5	-	7
	Collisions between trains	12	8	4	-	5	3	-	20
	LC accidents	102	-	-	63	-	2	46	111
	Derailments	42	3	-	-	34	-	-	37
	Hit by a train (not at LC)	1130	-	11	703	-	12	428	1154
	Falling from a train	35	6	-	-	25	-	5	36
	Other accidents	85	-	3	12	2	13	13	43
	Total at station	**1432**	**17**	**18**	**779**	**67**	**35**	**492**	**1408**
On open line	Collisions with an obstacle (not at LC)	105	1	-	6	9	4	6	26
	Collisions between trains	7	-	2	-	-	2	-	4
	LC accidents	494	-	2	346	29	12	250	639
	Derailments	59	25	1	-	26	3	-	55
	Hit by a train (not at LC)	1943	-	6	1398	-	9	585	1998
	Falling from a train	13	2	-	1	7	1	2	13
	Other accidents	37	-	-	10	-	4	12	26
	Total in open line	**2658**	**28**	**11**	**1761**	**71**	**35**	**855**	**2761**
not specified		**17**	**-**	**2**	**10**	**-**	**2**	**1**	**15**
GRAND TOTAL		**4107**	**45**	**31**	**2550**	**138**	**72**	**1348**	**4184**

- 65% of accidents occured on open line, whilst 35% happened in stations and yards.
- 69% of fatalities occured on open line.
- Persons hit by a train and LC accidents represented 96% of all fatalities.

1.12 Passenger victims by type of accident and location

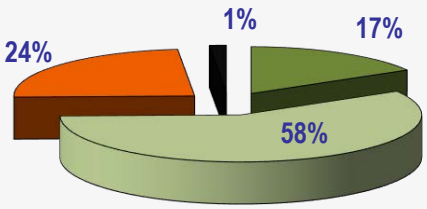


1.13 Staff victims by type of accident and location



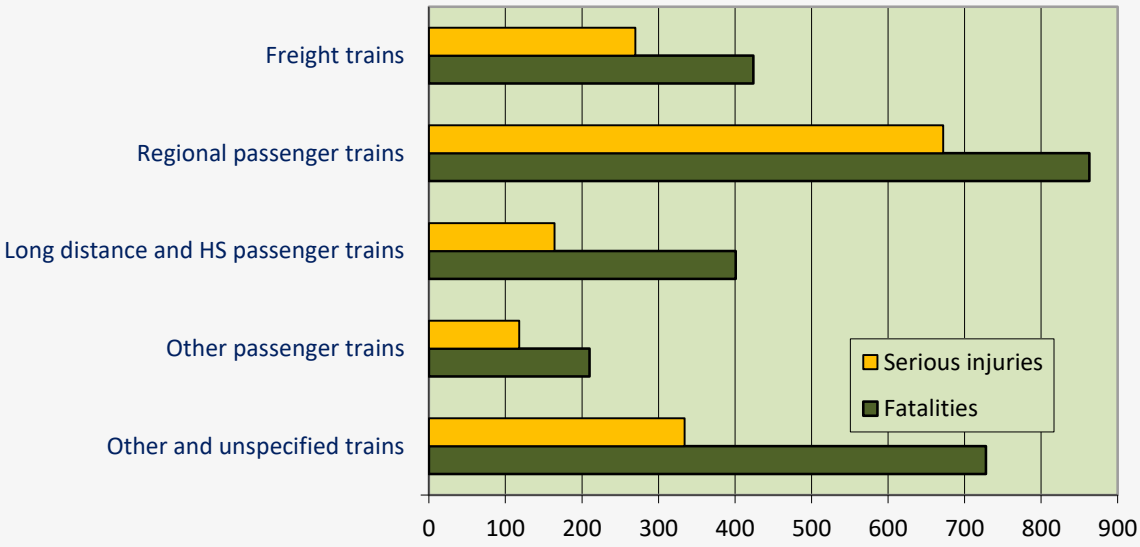
- Most of staff victims were hit by a train, and particularly during shunting operations (included in 'other types of accidents').

1.14 Victims by type of traffic



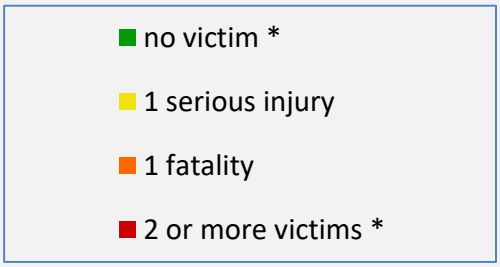
- Freight trains
- Passenger trains
- Locomotives running light, infrastructure trains, unspecified trains
- Shunting and runaway vehicles

Type of accident	Freight trains	Passenger trains	Locomotives running light, infrastructure trains, unspecified trains	Shunting and runaway vehicles
Collision	10	39	10	6
Derailment	-	89	3	1
Level-crossing accidents	155	535	65	11
Accidents to persons caused by rolling stock in motion	525	1761	921	45
Other accidents	4	4	-	-
TOTAL victims	**694**	**2428**	**999**	**63**

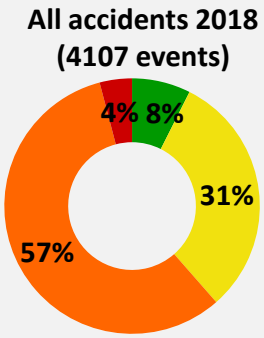


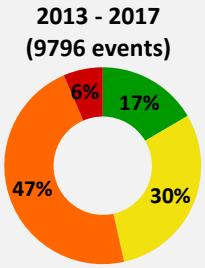
- Among accidents where the type of train is registered, regional passenger trains are involved in accidents leading to almost 50% of victims.
- The exceptionnally high number of unspecified trains is due to new members.

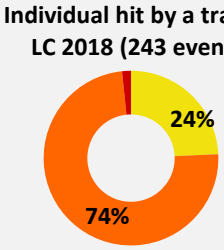
1.15 Accidents by type and number of victims

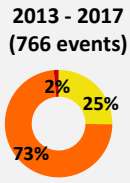


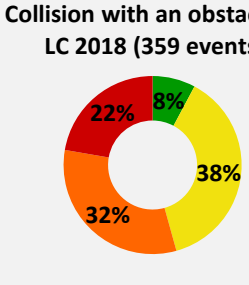
* a victim is a fatality or a serious injury

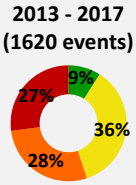


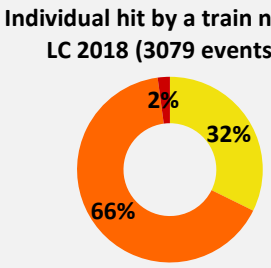


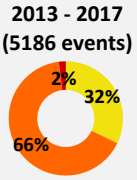


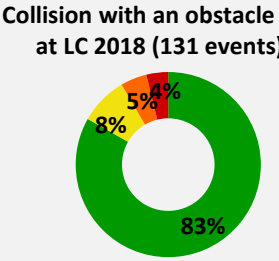


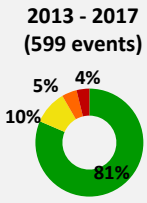


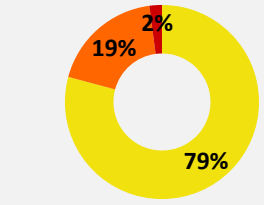


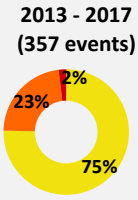


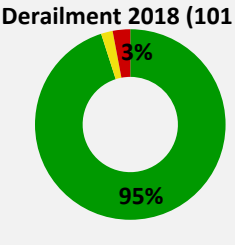


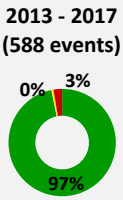


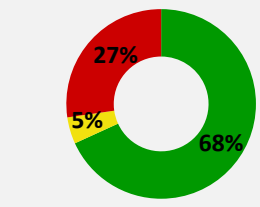


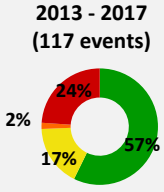






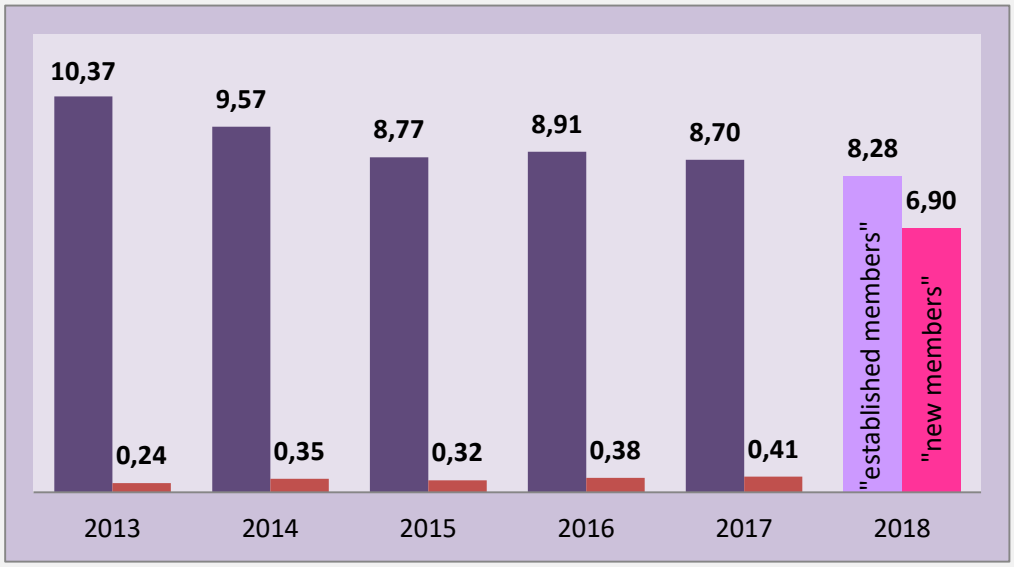






- Fires in RS: 24 events (4 serious injuries)
- Electrocutions: 4 events (1 fatality and 3 serious injuries)

1.16 UIC Global Safety Index



The UIC Global 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 Global 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	INF	-	-	OL	2109	2166	LC	243	247	P	-	-
	RS	1	1				SC	23	25			
	HF	31	32	S	1205	1231	BV	11	11	S	17	21
	RU	-	-				T	7	7			
3322	WE	-	-	Ot	8	8	O	3014	3090	T	2294	1073
3405	TP	3289	3371									
Train collision with an obstacle	INF	21	4	OL	433	497	LC	359	508	P	1	39
	RS	8	-				SC	9	-			
	HF	22	11	S	53	41	BV	3	3	S	2	23
	RU	-	-				T	7	5			
490	WE	61	7	Ot	4	3	O	108	22	T	233	243
541	TP	374	518									
Individual falling from a train	INF	-	-	OL	13	13	LC	-	-	P	8	32
	RS	-	-				SC	-	-			
	HF	3	3	S	35	36	BV	-	-	S	-	1
	RU	38	38				T	-	-			
48	WE	-	-	Ot	-	-	O	47	48	T	1	7
49	TP	7	8									
Train collision with another train	INF	-	-	OL	7	4	LC	-	-	P	8	5
	RS	2	4				SC	5	3			
	HF	19	18	S	12	20	BV	-	-	S	6	7
	RU	-	-				T	-	-			
22	WE	-	-	Ot	3	2	O	14	23	T	-	-
26	TP	-	-									
Derailment	INF	33	88	OL	59	55	LC	-	-	P	28	60
	RS	22	-				SC	25	1			
	HF	30	3	S	42	37	BV	-	-	S	1	3
	RU	-	-				T	2	-			
101	WE	6	-	Ot	-	-	O	68	91	T	-	-
92	TP	1	-									
Electrocution	INF	-	-	OL	3	3	LC	-	-	P	-	-
	RS	-	-				SC	-	-			
	HF	1	1	S	1	1	BV	-	-	S	-	1
	RU	-	-				T	-	-			
4	WE	-	-	Ot	-	-	O	4	4	T	1	2
4	TP	3	3									
Fires	INF	2	-	OL	14	3	LC	-	-	P	-	1
	RS	21	4				SC	-	-			
	HF	-	-	S	10	1	BV	-	-	S	-	3
	RU	1	-				T	1	-			
24	WE	-	-	Ot	-	-	O	23	4	T	-	-
4	TP	-	-									

Type of accidents	Causes			Location						Victims		
				Type of location			Location details				Fatal.	S. Inj.
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	INF	1	-	OL	20	20	LC	10	11	P	-	1
	RS	2	-				SC	22	3			
	HF	43	16	S	74	41	BV	-	-	S	5	13
	RU	2	1				T	-	-			
96	WE	1	-	Ot	2	2	O	60	46	T	21	23
63	TP	43	44									
Runaway vehicles	INF	-	-	OL	-	-	LC	-	-	P	-	-
	RS	-	-				SC	-	-			
	HF	-	-	S	-	-	BV	-	-	S	-	-
	RU	-	-				T	-	-			
-	WE	-	-	Ot	-	-	O	-	-	T	-	-
-	TP	-	-									
TOTAL	INF	57	92	OL	2658	2761	LC	612	766	P	45	138
	RS	56	9				SC	84	32			
	HF	149	84	S	1432	1408	BV	14	14	S	31	72
	RU	41	39				T	17	12			
4107	WE	68	7	Ot	17	15	O	3338	3328	T	2550	1348
4184	TP	3717	3944									
											2626	1558

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 2013-2018

Part 2 - Time series and trends 2013-2018

excluding Russia (data available for 2018 only) and Greece (data available from 2015 only)

2.01 Significant accidents

CAUSES

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

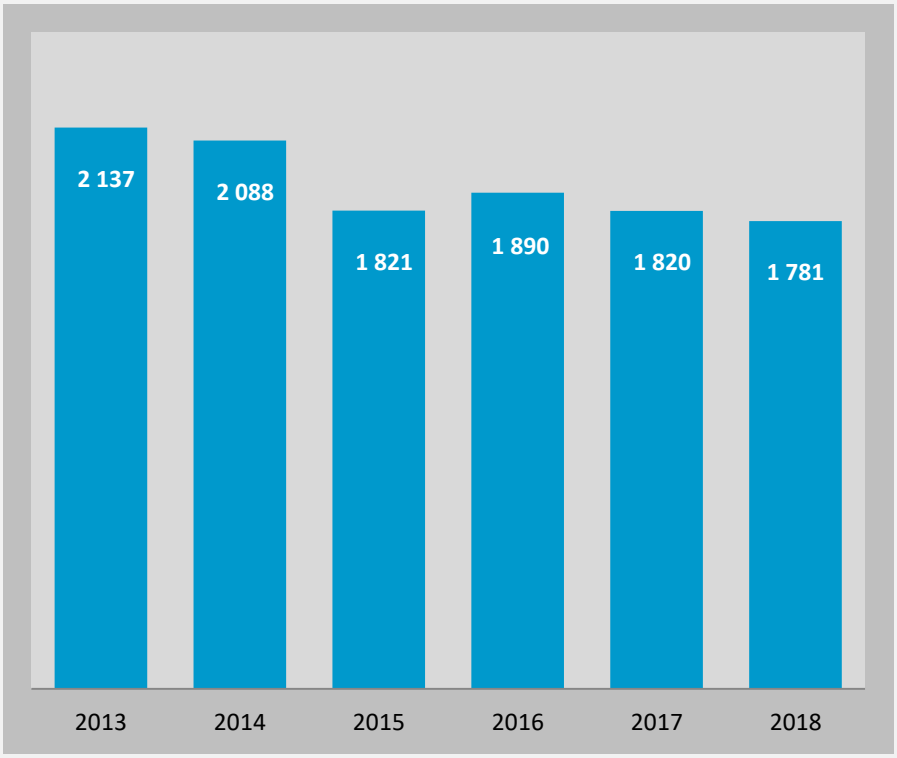
2.01a All significant accidents

Significant accidents declared by railway members of the Safety Database dropped from 2137 in 2013 to 1780 in 2018, which means a decrease of -17%.

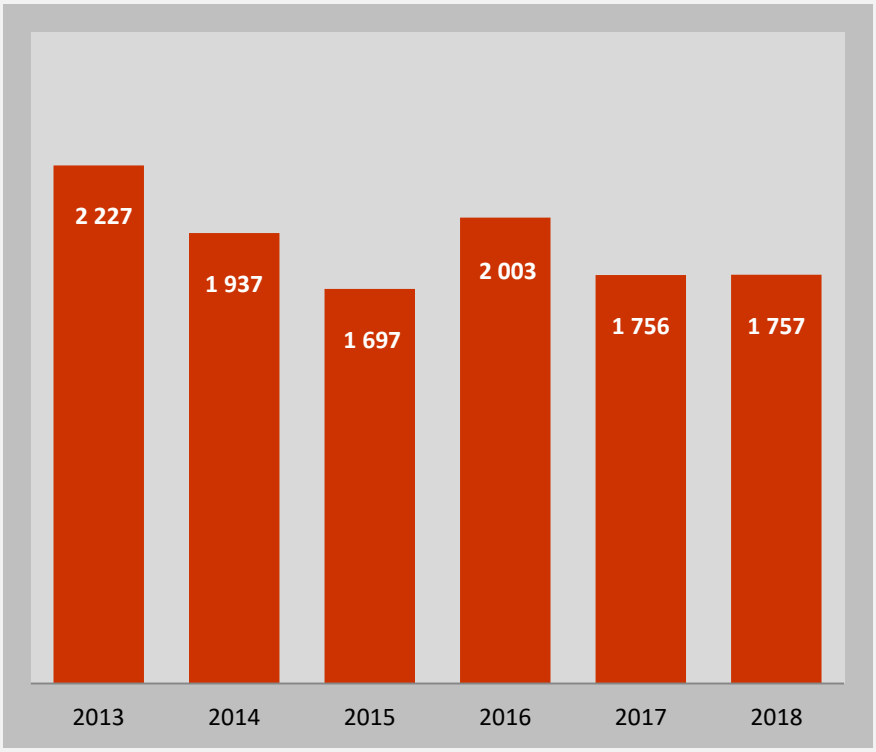
We observe a relative stability in the number of significant accidents on the last four years.

Trends are presented since 2013, in order to keep the same geographical perimetre 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 accidents in workshops, warehouses and depots.



2.01b Victims of rail accidents



The number of victims of significant rail accidents is stable in 2017 and 2018, slightly over the good result of 2015.

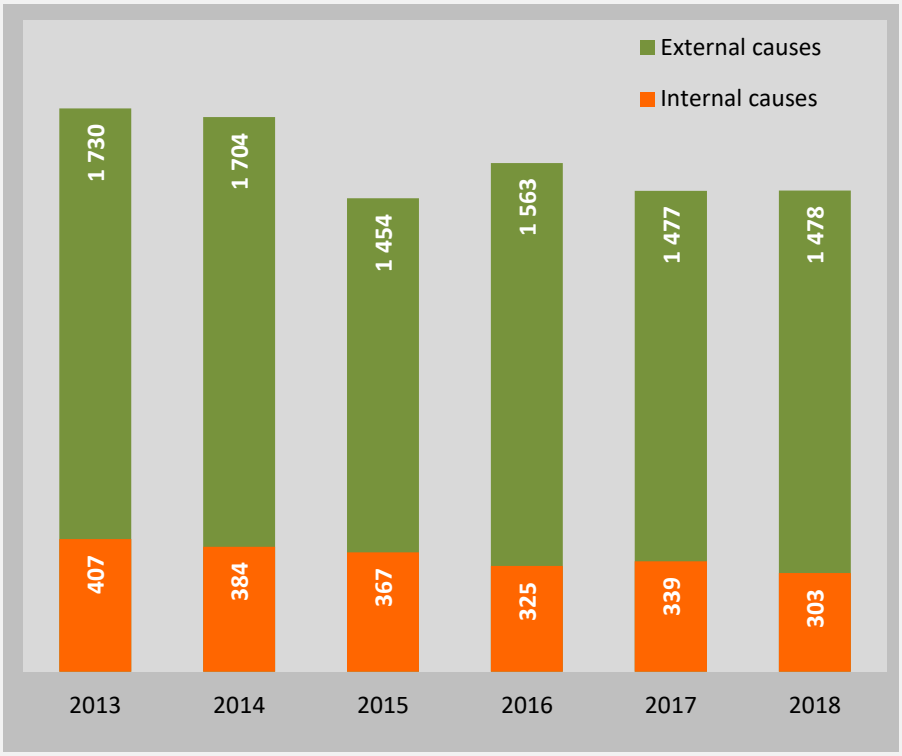
The number of victims decreased 21% compared to the year 2013.

2.02a Accidents per internal / external causes

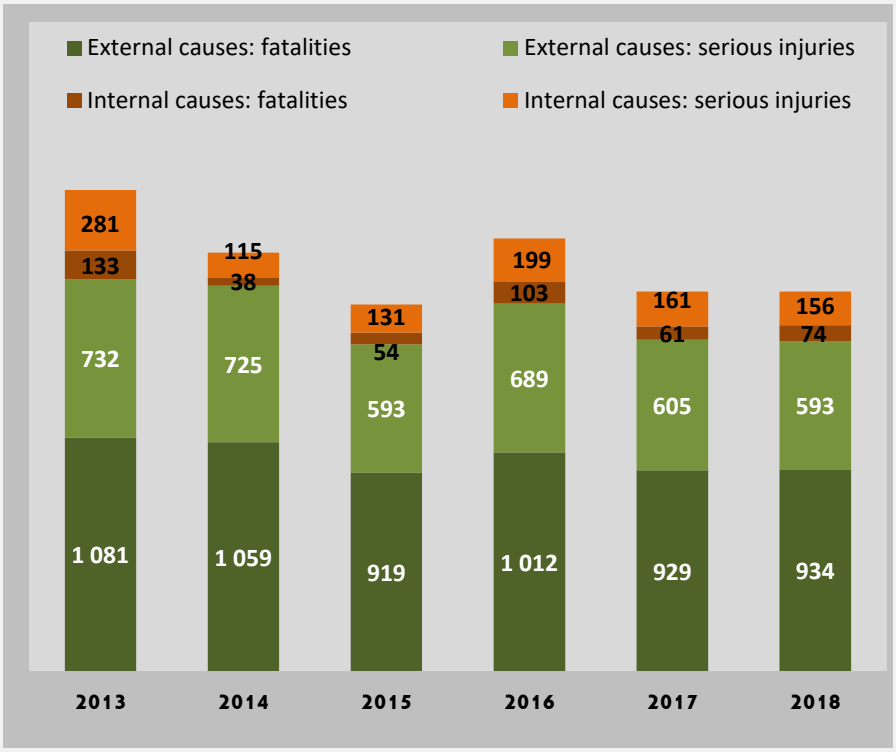
The number of accidents with internal causes decreased -25% between 2013 and 2018, while the number of accidents with external causes decreased -15%.

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



Decrease from 2013 to 2018:

Internal causes	-44%
fatalities	-44%
serious injuries	-44%
External causes	-16%
fatalities	-14%
serious injuries	-19%

In the year 2018:

✓ External causes are responsible for 84% of all victims and 86% of all fatalities.
✓ 61% of victims of accidents with external causes are fatalities.
✓ Only 32% of victims of accidents with internal causes are fatalities.

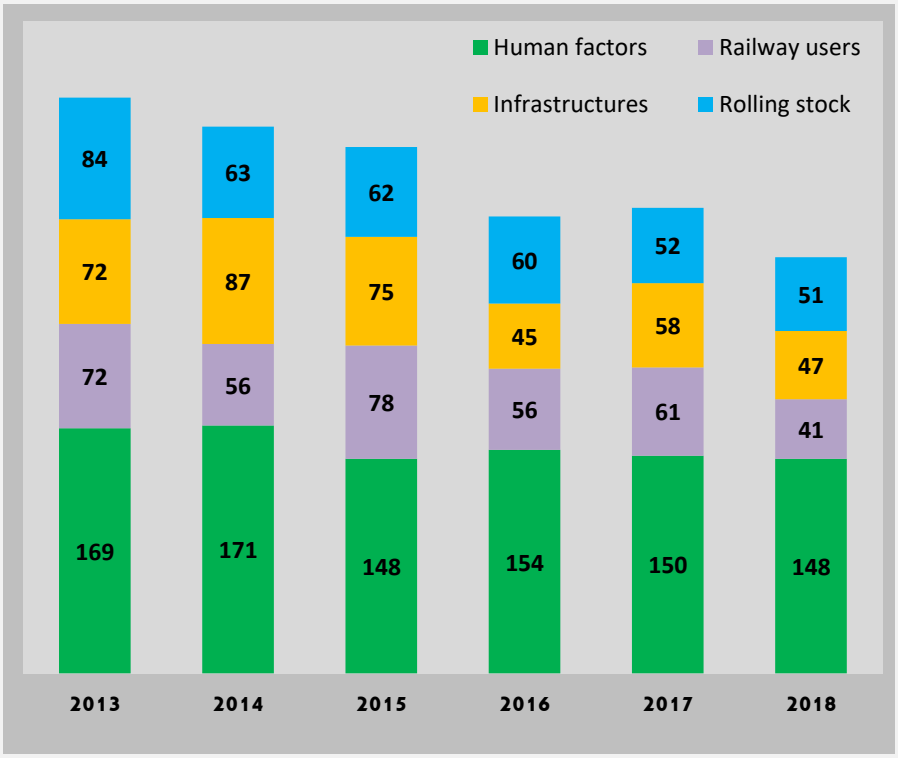
2.03a Accidents per internal causes

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

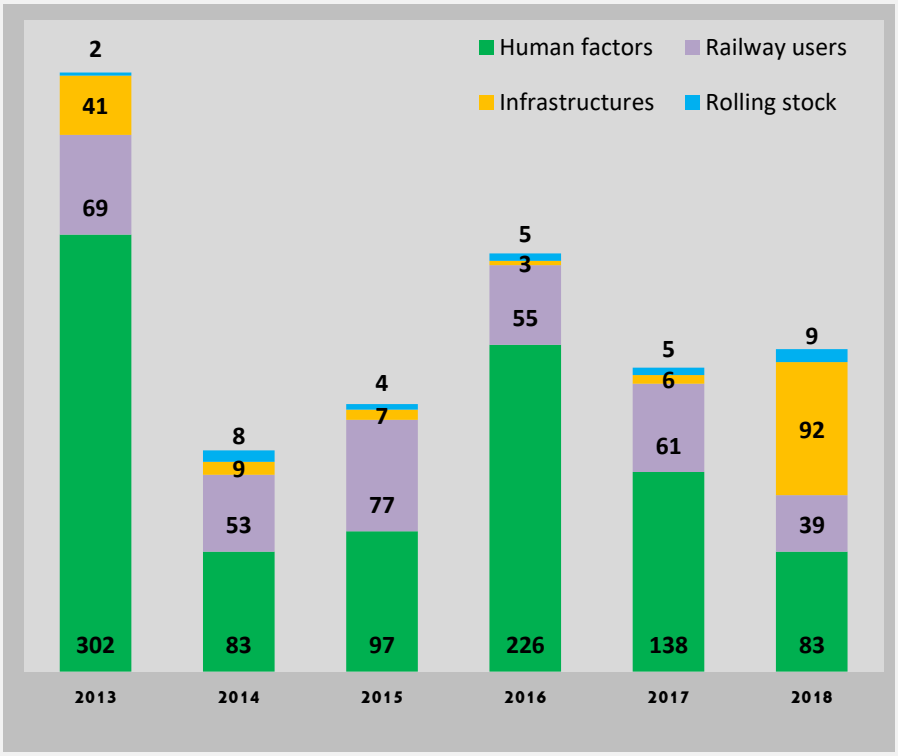
The most important decrease concerns accidents with "railway users" causes (mostly passengers): - 43%

On the other hand, accidents with "human factor causes" only decreased -12% between 2013 and 2018.

As a result, accidents with "human factor causes" increase their part among accidents with internal cause from 43% to 52%.



2.03b Victims per internal causes



The number of victims of accidents with internal cause fell drastically between 2013 and 2014 (-71%).

Number of accidents and number of victims are quite disconnected. A few severe accidents may have a huge number of victims (year 2013, for instance).

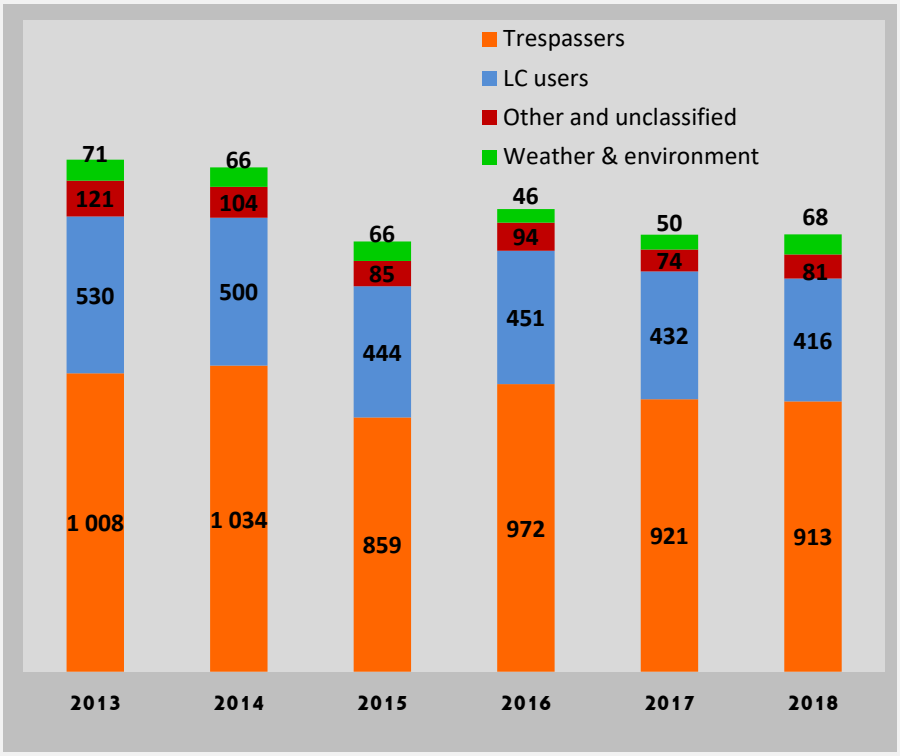
We observe a huge number of victims in accidents caused by infrastructure defects in 2018. This is mostly due to two derailments representing 85 out of 92 victims.

2.04a Accidents per external causes

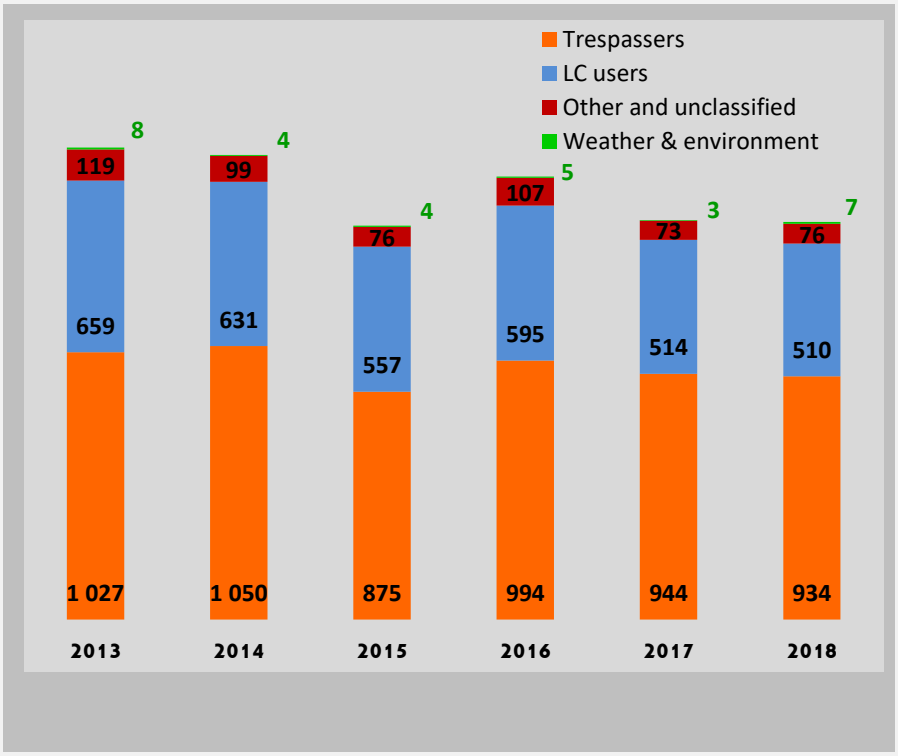
The number of accidents with external cause decreased -15% between 2013 and 2018. The main drop occurred between 2014 and 2015.

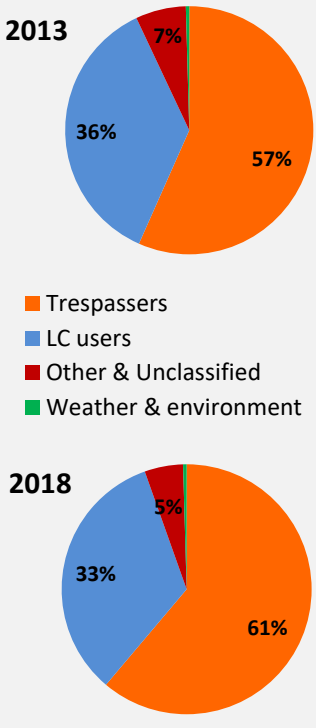
Trespassers remain the most common cause of accident: 62% of all accidents with external causes in 2018. Their number only decreased -10% in the period.

LC users are causing 28% of all accidents with external causes in 2018. Compared to 2013, their number decreased -22%, which might show the impact of awareness campaigns like ILCAD.



2.04b Victims per external causes





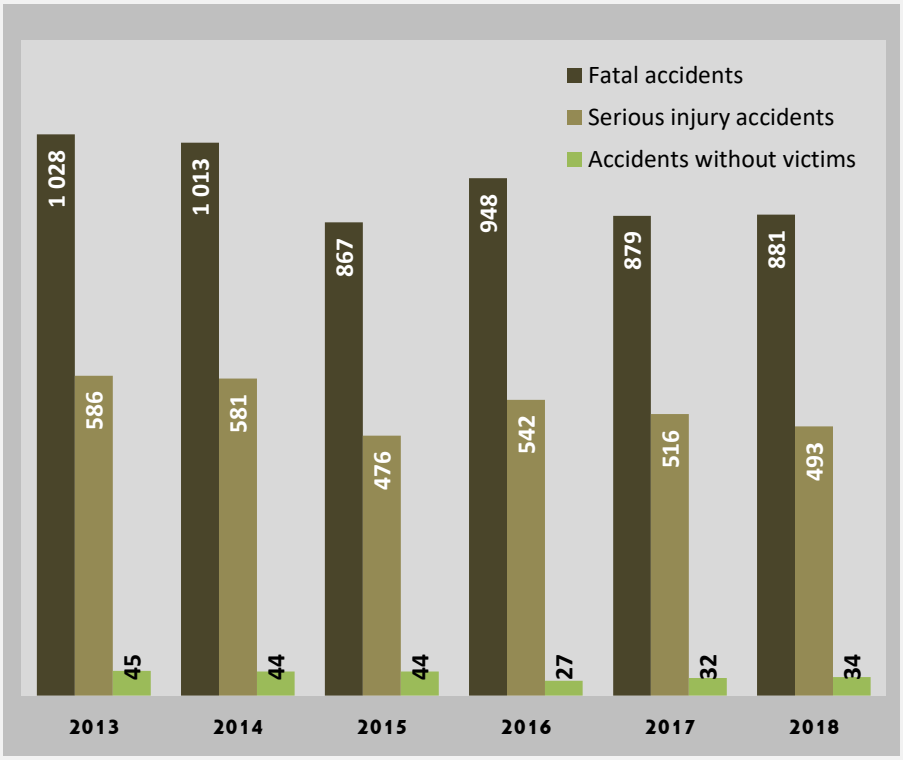
2.05a Accidents caused by third parties

Accidents caused by third parties decreased -15% between 2013 and 2018.

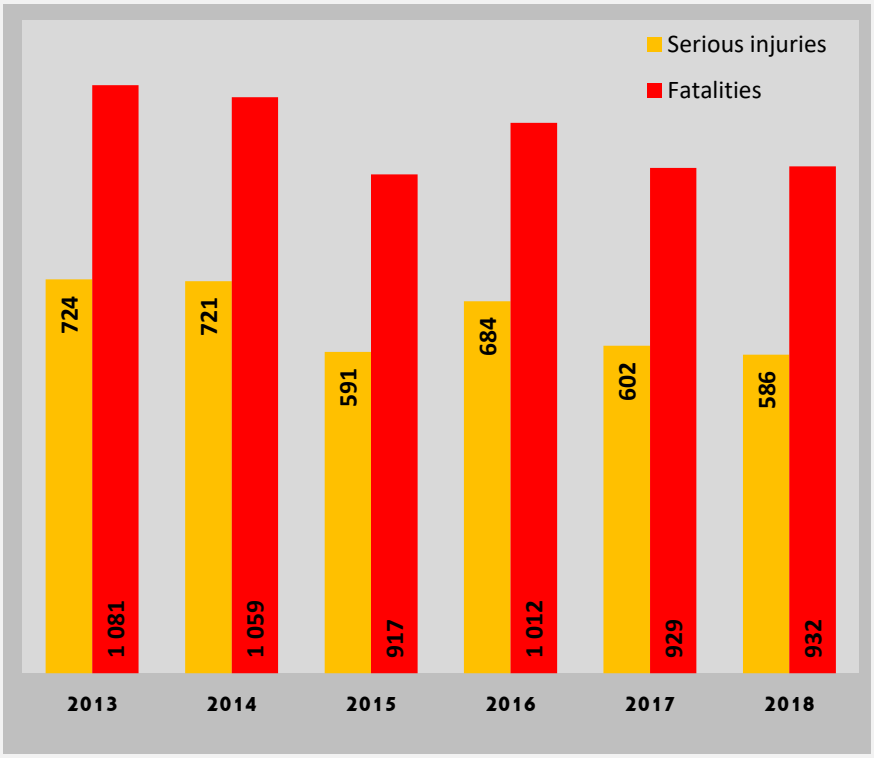
96% of fatal accidents and 86% of serious injury accidents are caused by tird parties (year 2018).

Serious injuries decreased -19% and fatalities decreased -14% on the 6-year period.

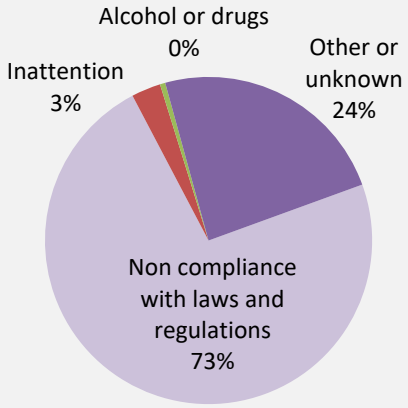
Non compliance with laws and regulations is the most comon cause at third level, representing 88% of cases in 2018.



2.05b Victims of accidents caused by third parties



Split of victims per cause at third level 2017

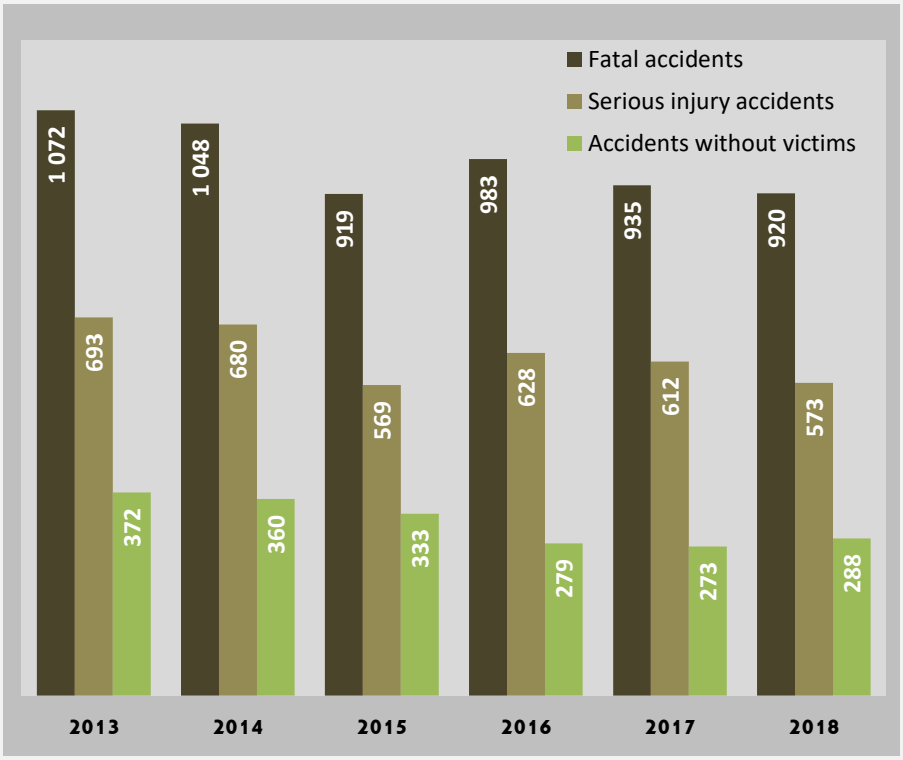


2.06a Accidents per human consequences

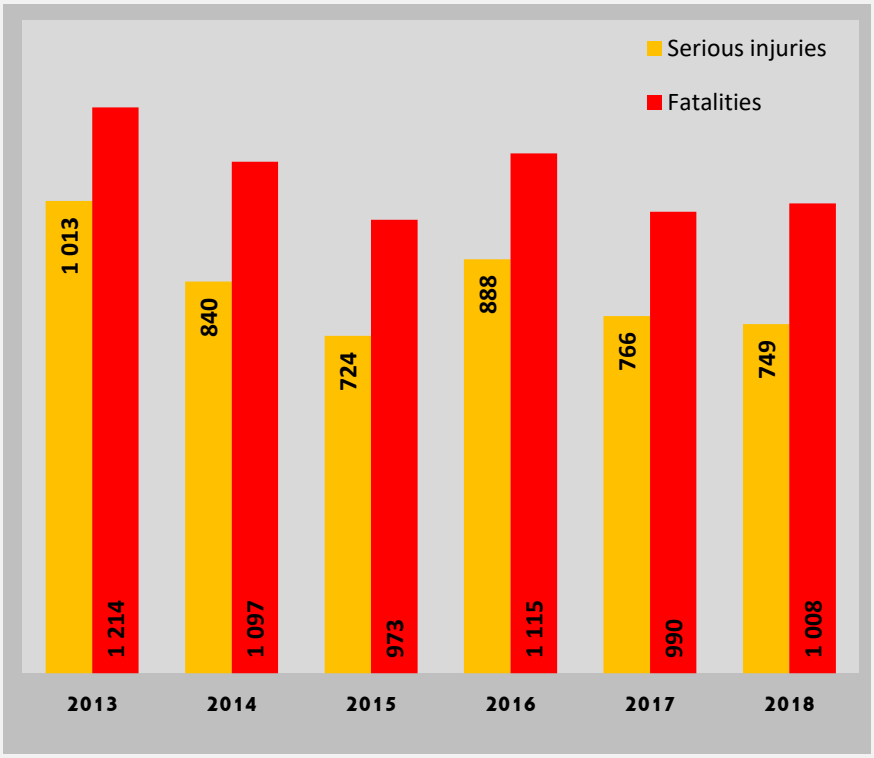
Fatal accidents roughly represent half of all significant accidents. This proportion is stable along the years.

A maximum of 52% of fatal accidents was observed in 2016 and a minimum of 50% in 2013.

Fatal accidents decreased by 14% from 2013 to 2018 while serious injury accidents decreased by 17%.



2.06b Fatalities and serious injuries



From 2013 to 2018, fatalities decreased -17% while serious injuries decreased -26%.

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 decreased -31% between 2013 and 2018.

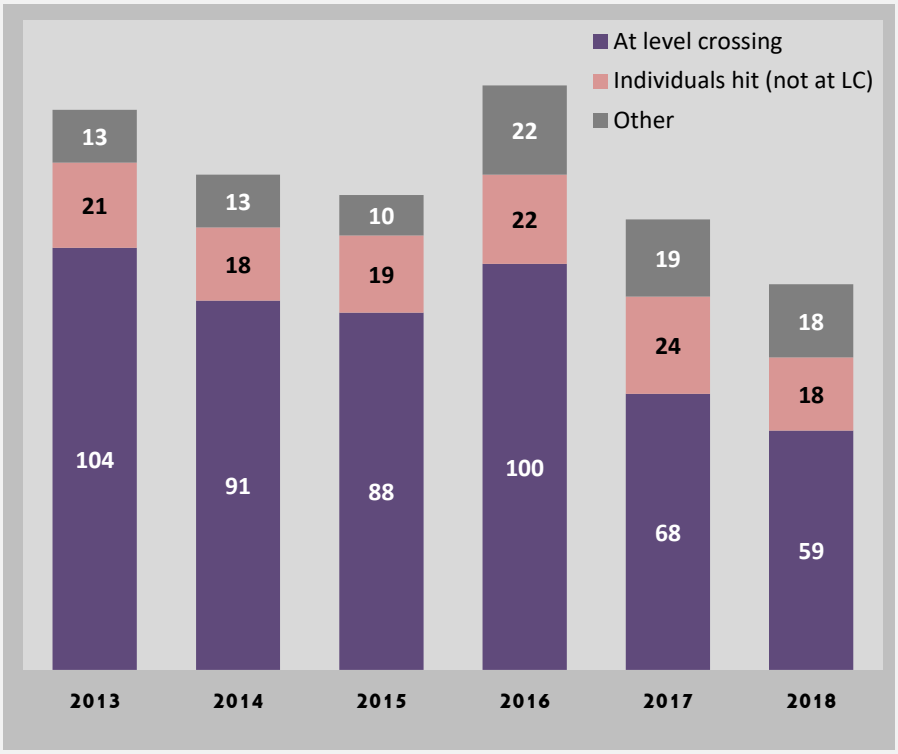
The number of collisions with road vehicles at level crossings dropped -43% since 2013.

The heaviest accidents that occurred during 2018 are:

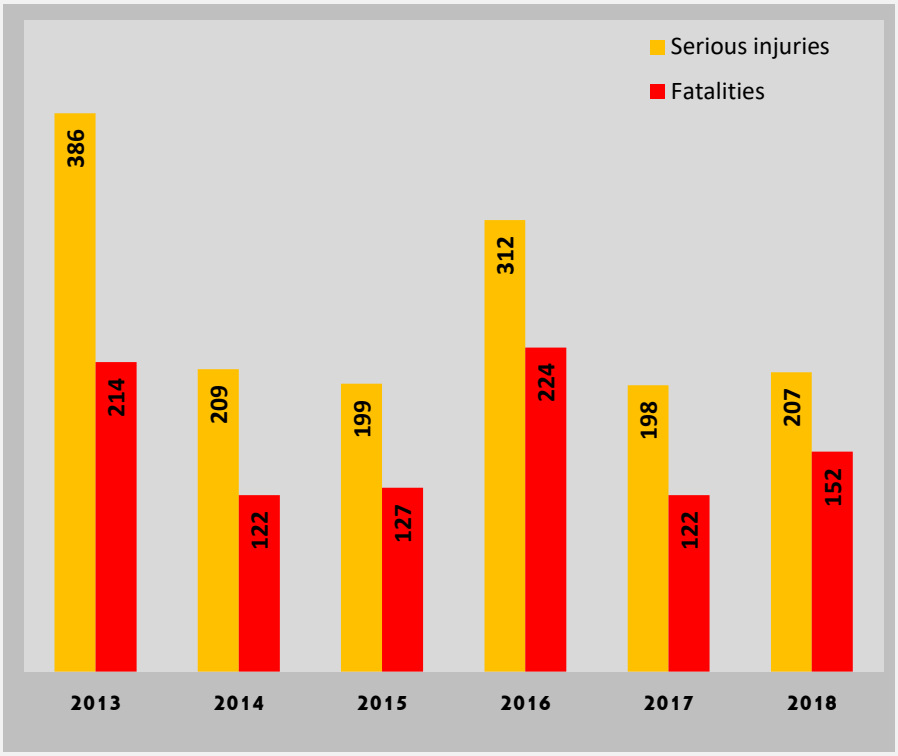
- two derailments with respectively 50 and 37 victims;

- a collision with a lorry at level crossing (23 victims);

- a collision with a locomotive (10 victims).



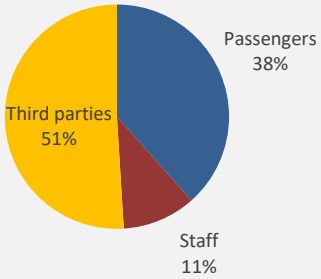
2.07b Victims of severe accidents



Severe accidents are unpredictable.

The number of victims of severe accidents in 2018 is close to the numbers observed in 2014, 2015 and 2017.

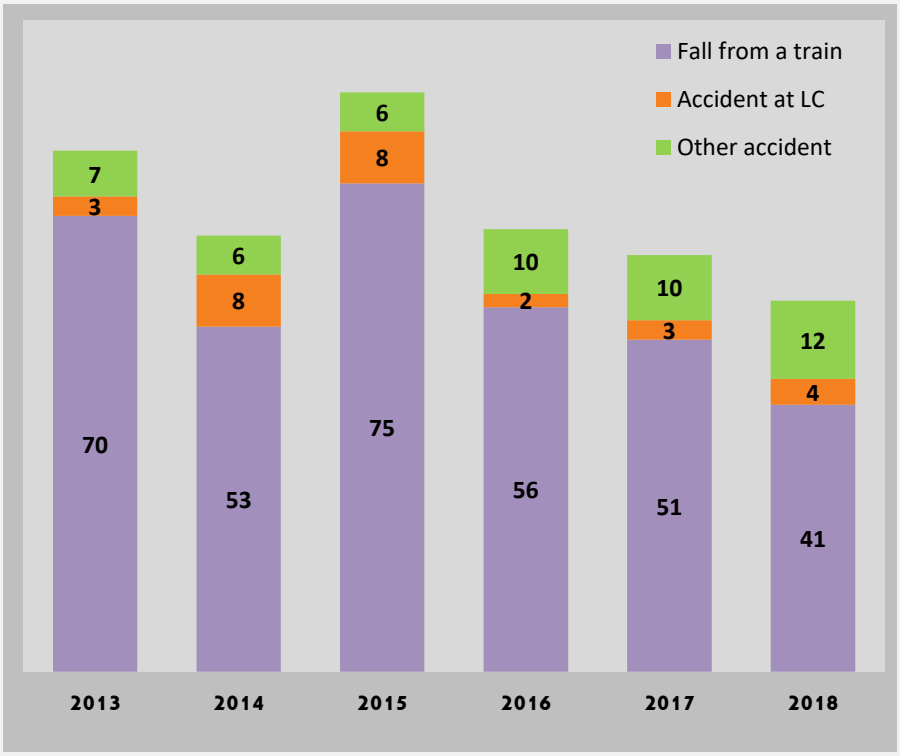
Split of victims 2018



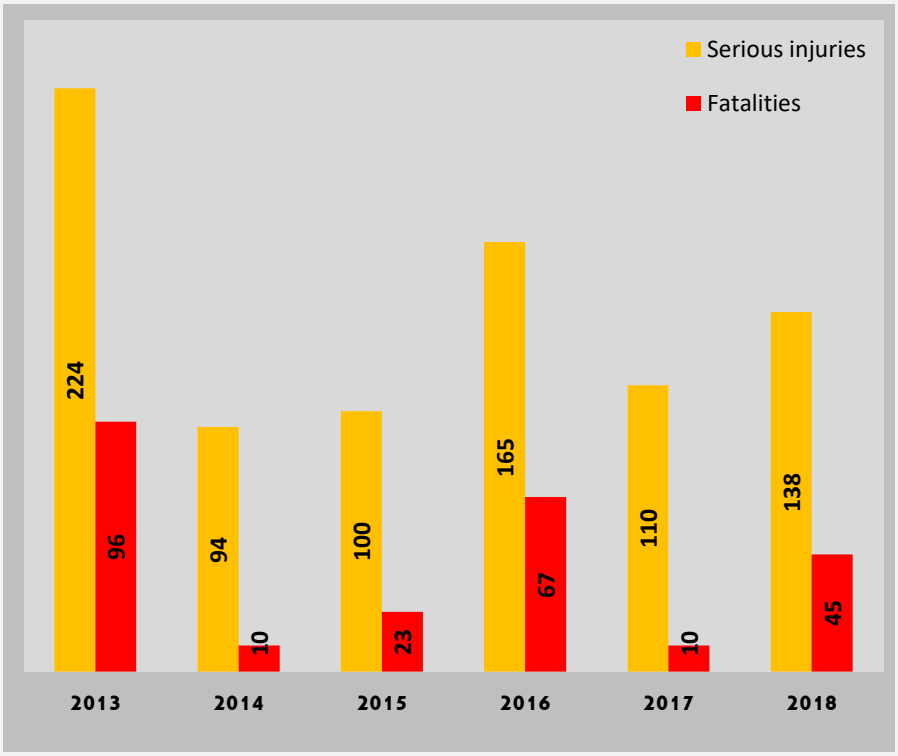
2.08a Accidents with passenger victims

The number of accidents with passenger victims decreases, since the peak of 2015. The figure obtained in 2018 (57 accidents) is the lowest observed since 2006.

72% of events with passenger victims are "individuals falling from a train", representing 22% of passenger victims.

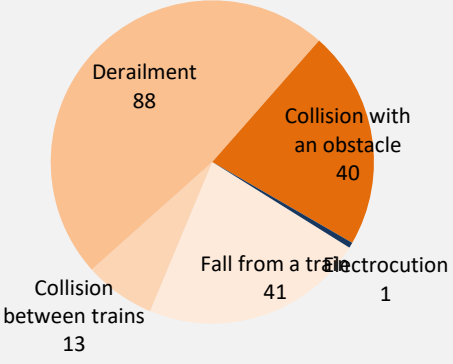


2.08b Passenger victims



One collision with a lorry at LC and two derailments are responsible for 67% of passenger fatalities and 57% of serious passenger injuries.

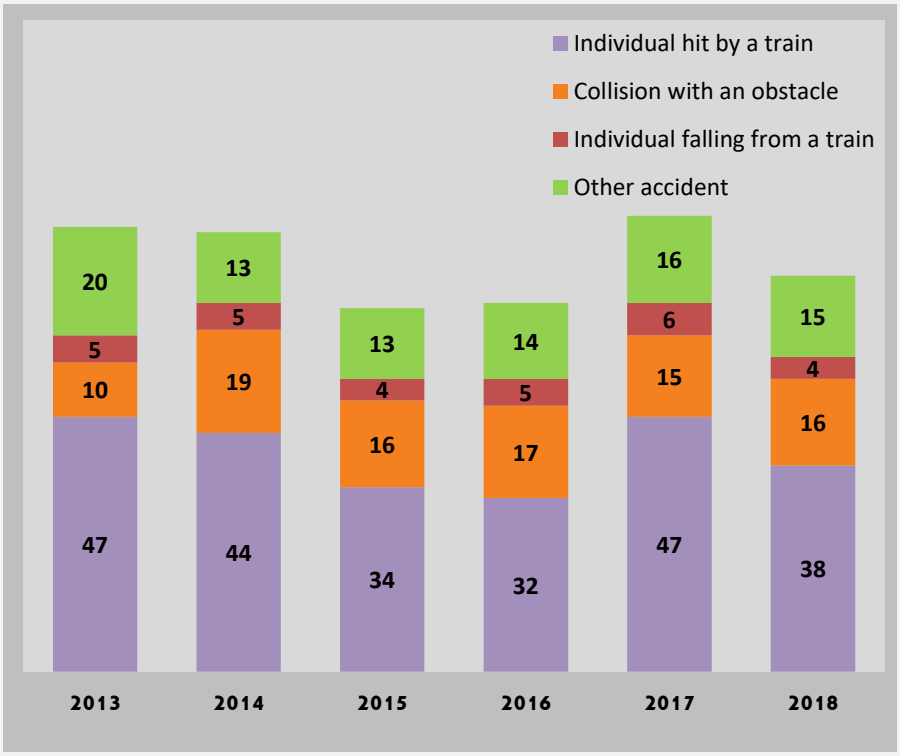
Split of passenger victims in 2018



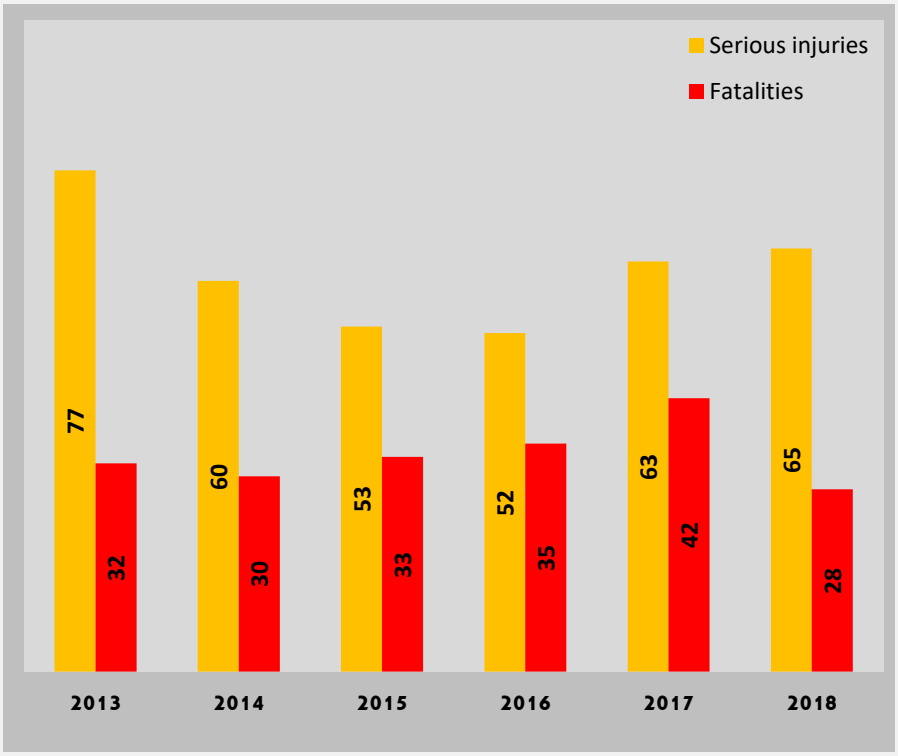
2.09a Accidents with staff victims

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 (53% of accidents are workers hit by a train).



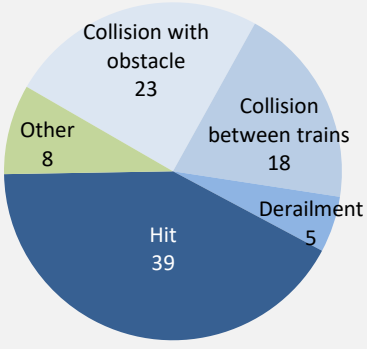
2.09b Staff victims



Staff members hit by a train represent less than one third of staff serious injuries (31%) but more than two thirds of staff fatalities (68%).

For the first year since 2014, the number of staff fatalities stops increasing.

Split of staff victims in 2018

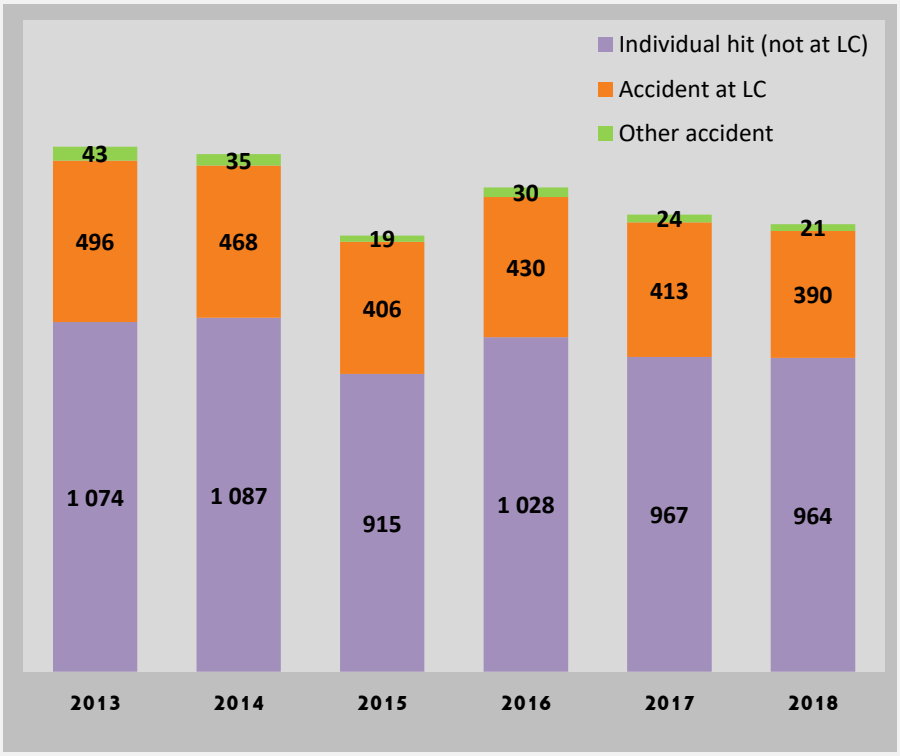


2.10a Accidents with third parties victims

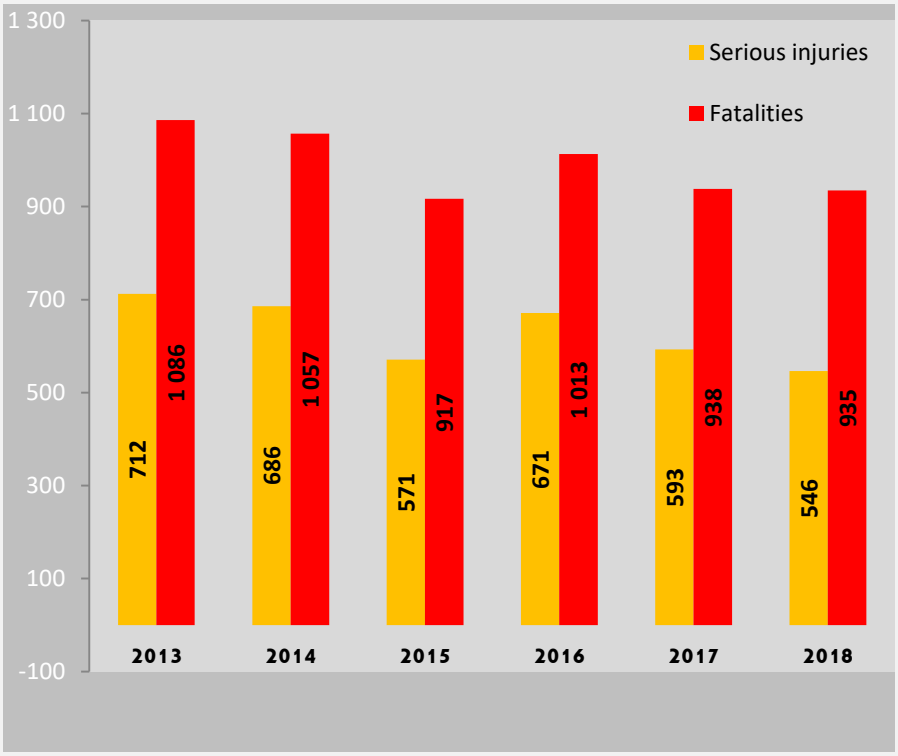
The number of accidents with third parties victims decreased -15% since 2013.

The number of accidents at LC decreased twice quicklier (-21%) than the number of individuals hit outside LC (-10%).

These two types of accidents represented 98.5% of accidents with third parties victims in 2018.



2.10b Third parties victims



Fatalities decreased -14% from 2013 to 2018, whilst serious injuries decreased -23%.

Fatalities represent around 60% of all victims every year.

In 2018, most victims where trespassers (63%), followed by LC users (32%) and other third parties (5%), mostly pedestrians on public railway area (platforms).

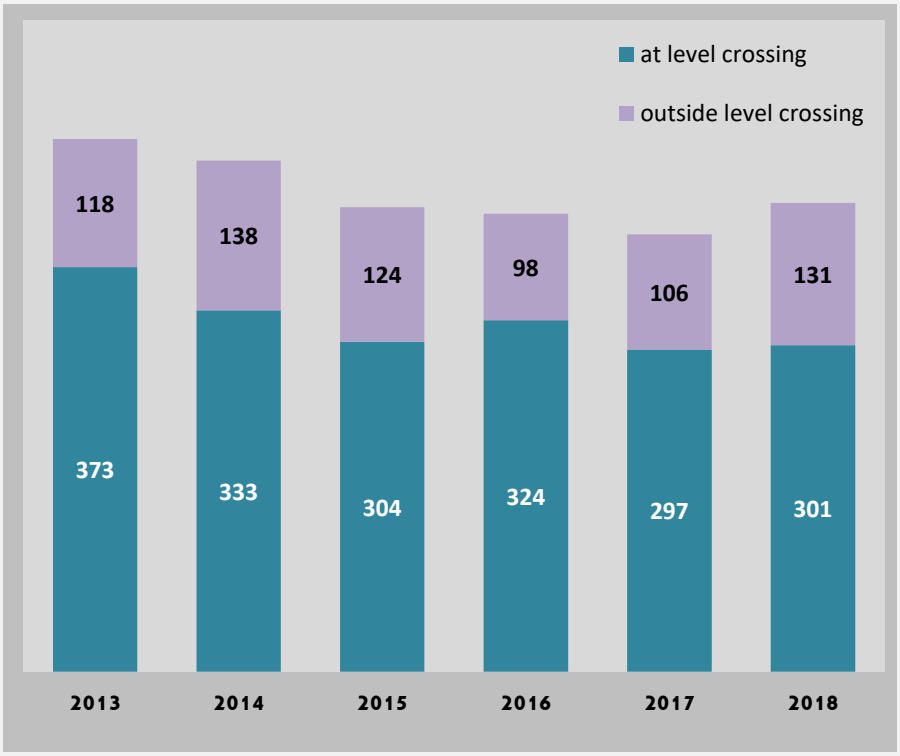
2.11a Collisions with an obstacle

This graph excludes shunting operations.

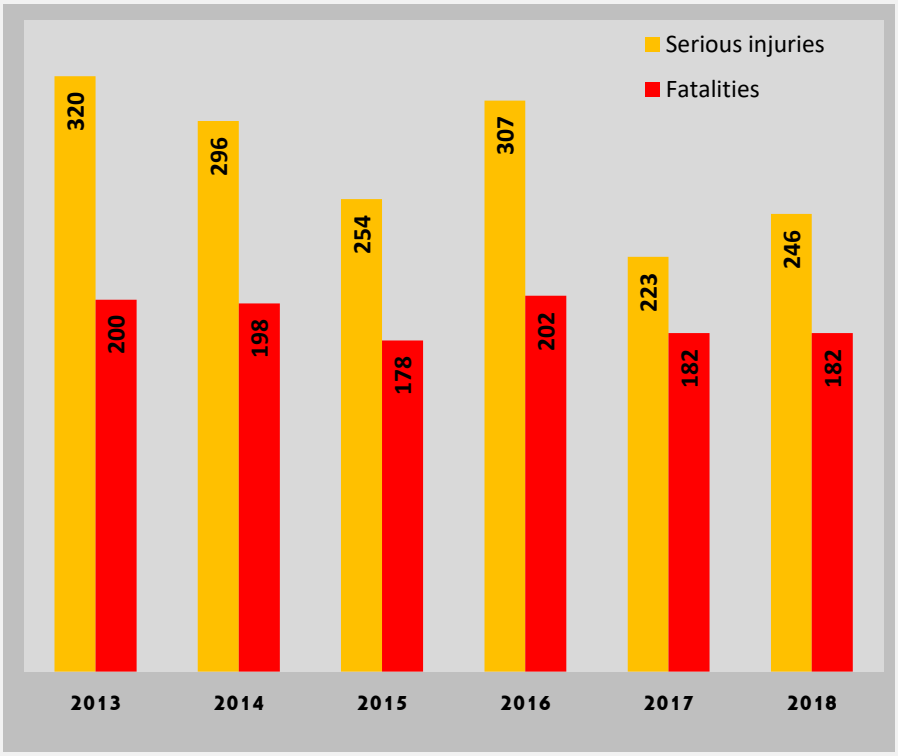
Collisions with an obstacle are stable since 2013.

Collision with an obstacle outside level crossing even increase since 2016.

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 2018 than 2013:

⇨ 1.06 victim per event in 2013;
⇨ 0.99 victim per event in 2018.

The total number of victims decreased -18% on the period (fatalities: -10% and serious injuries: -23%).

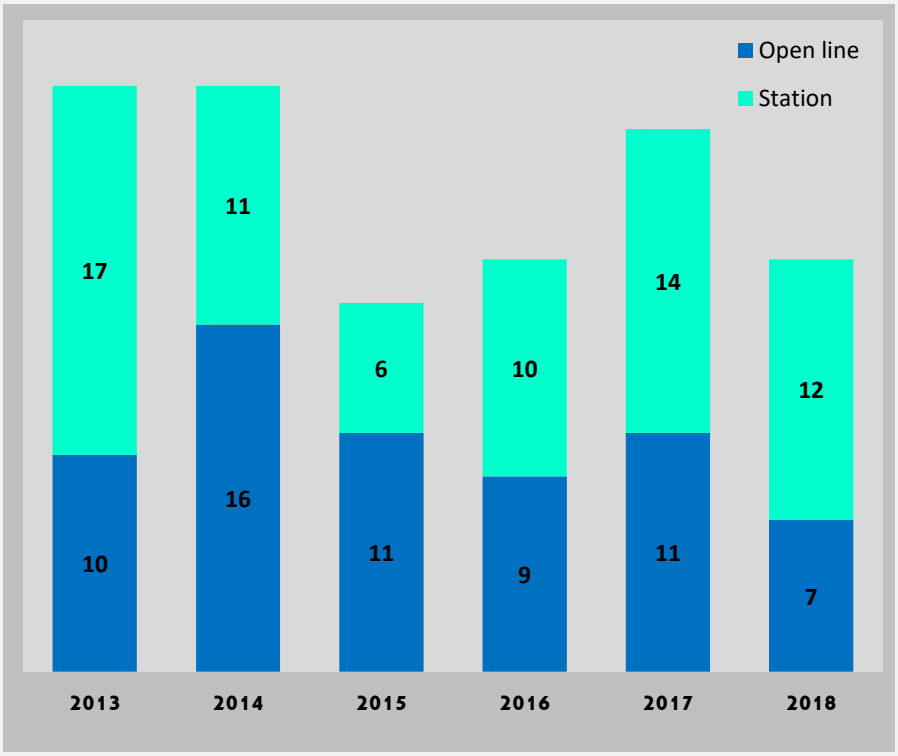
Level crossing users represent 82% of the 427 victims in 2018.

2.12a Collisions between trains

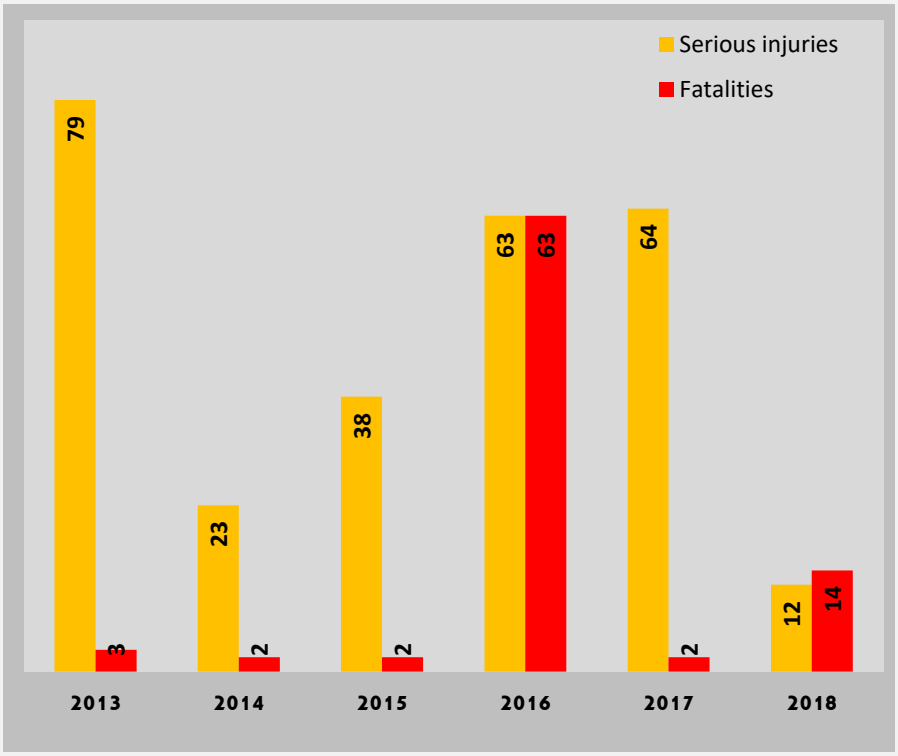
This graph excludes shunting operations.

There is no observable trend towards fewer collisions between trains on the period.

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:

2013	78%
2014	67%
2015	75%
2016	83%
2017	74%
2018	53%

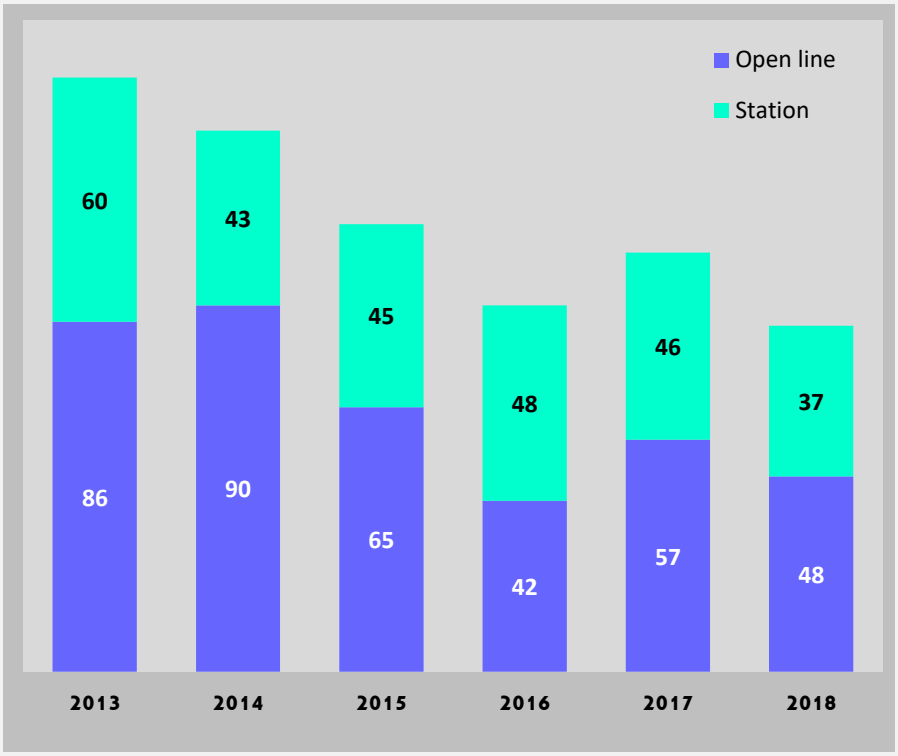
On the whole period, 10 accidents led to 75% of accounted victims in collisions between trains.

2.13a Derailments

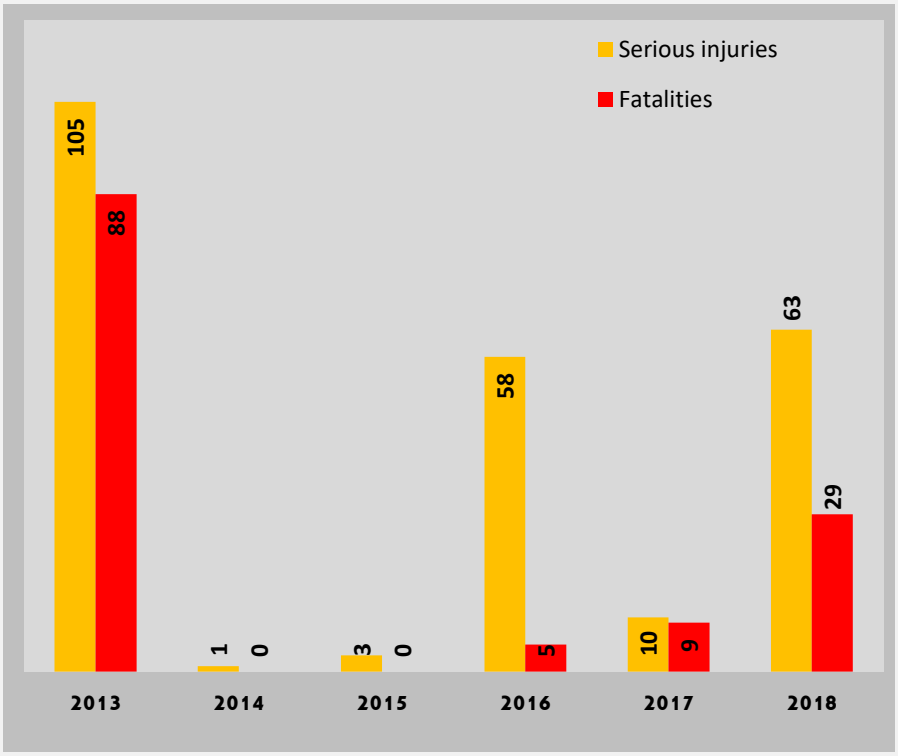
The number of derailments regularly decreased from 2013 to 2018 with the exception of the year 2017. Derailments of freight trains decreased - 47% since 2013 whilst derailments of passenger trains decreased -22%.

69% of derailments in the year 2018 concerned freight trains (against respectively 21% passenger trains and 10% infrastructure trains and other trains).

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



2.13b Victims of derailments



97% of all derailments during the period had no human consequences.

Four accidents generated 91% of all fatalities and 88% of all serious injuries.

13 accidents were fatal during the period, of which 3 occurred in 2018.

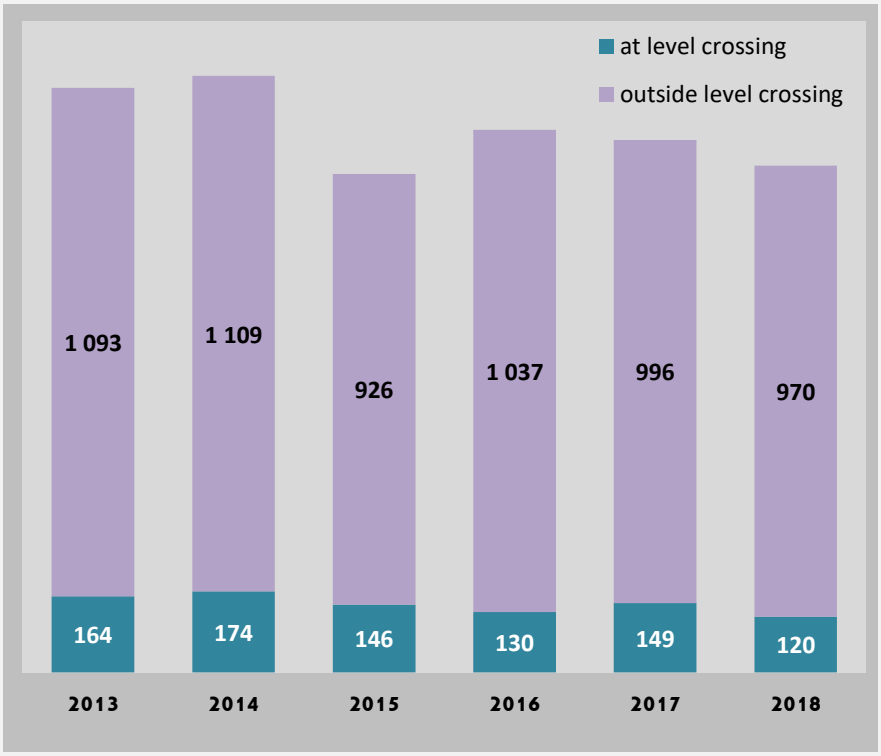
In 2018, 95% of victims were passengers.

2.14a Individuals hit by a train: accidents

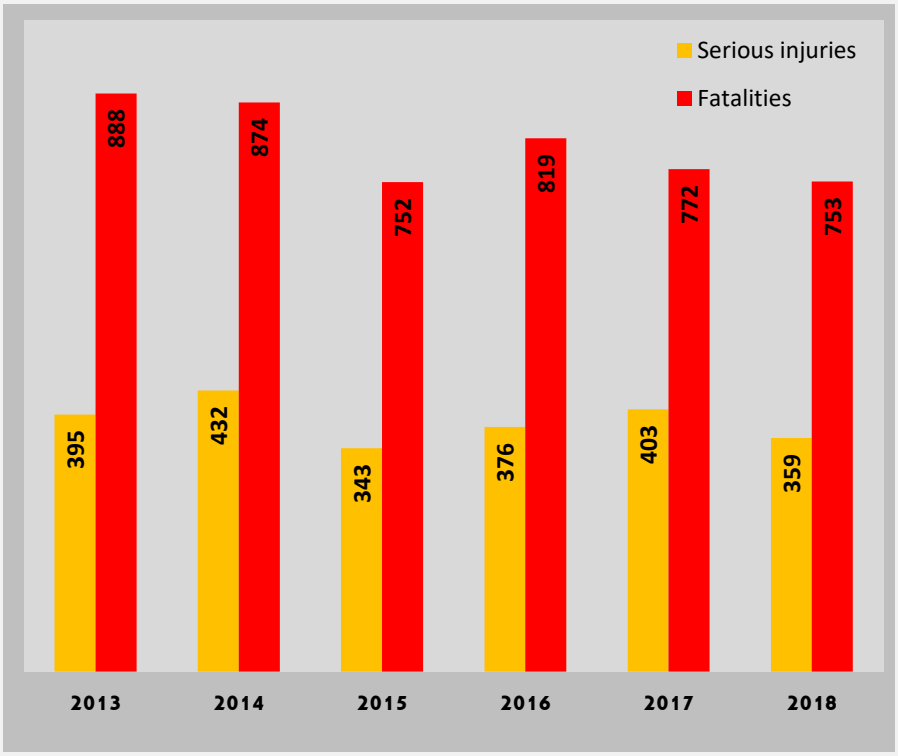
No real trend is observable regarding individuals hit by a train.

Pedestrians (or cyclists) hit by a train represent between 11 % and 13% of this type of accident. This ratio is stable along the years.

The total number of individuals hit by a train during 2018 is just above the minimum observed in 2015.



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 2018:

- ⇨ Trespassers 81%
- ⇨ LC users 11%
- ⇨ Persons hit on platform 5%
- ⇨ Staff 3%

Split of accidents per number of victims in 2018:

- ⇨ 1 victim: 1 071 events (98%)
- ⇨ 2 victims: 16 events
- ⇨ 3 victims: 3 events

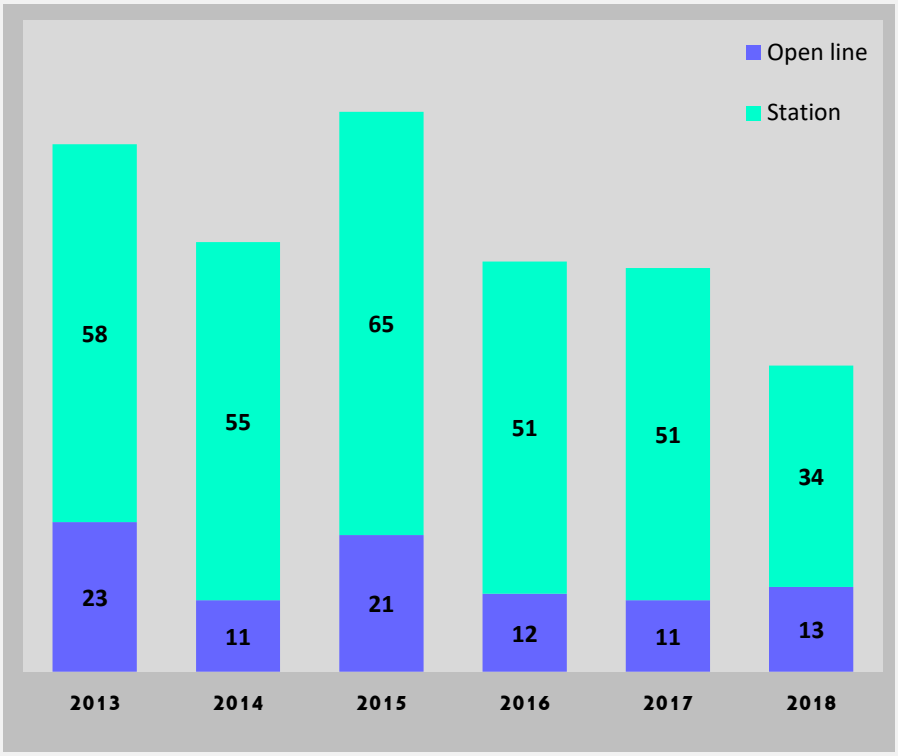
2.15a Individuals falling from a train: accidents

Individuals falling from a train are less and less common. This type of accident now represents less than 3% of all accidents.

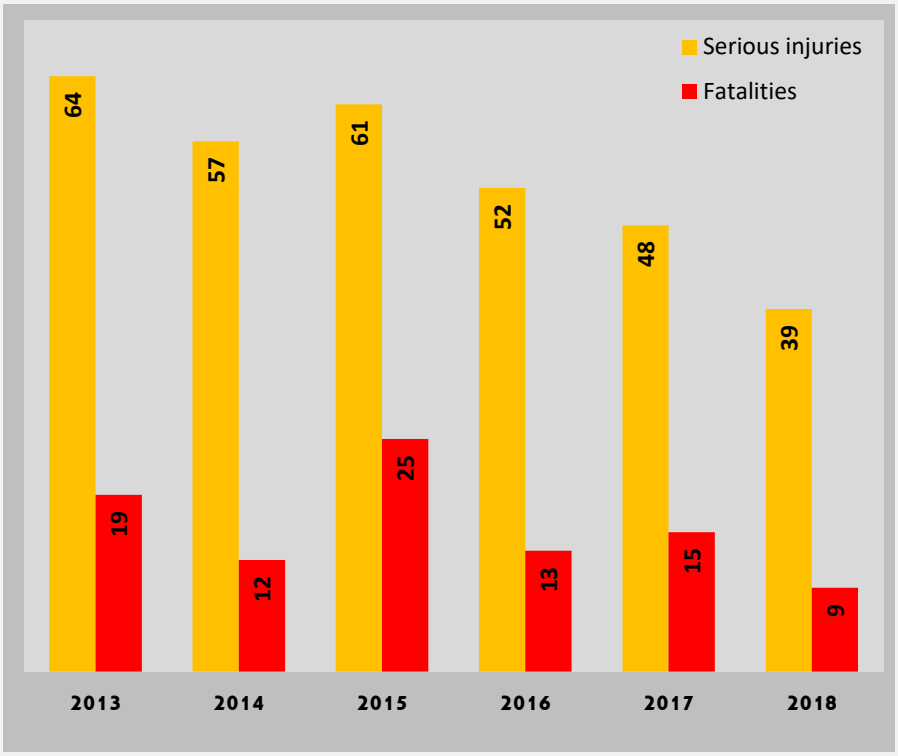
Most events occurred at station.

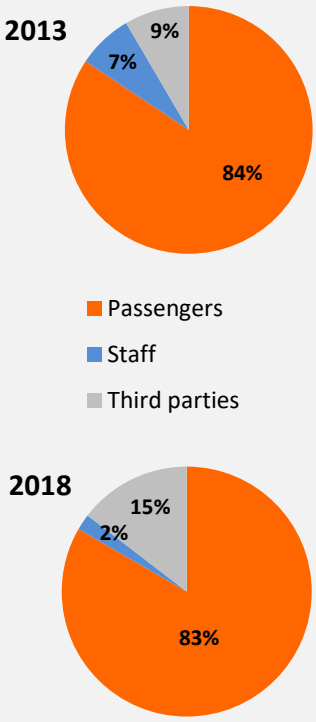
During the year 2018, passengers were involved in 40 cases, staff in 1 case and trespassers in 6 cases.

The graph excludes shunting operations.



2.15b Individuals falling from a train: victims





2.16a Accidents at level crossings

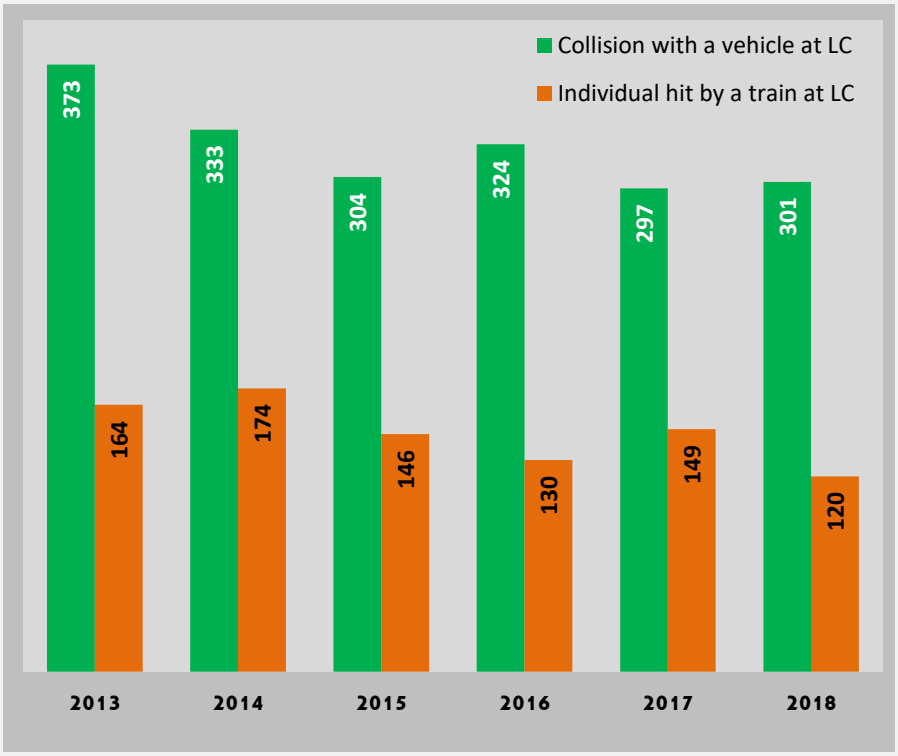
Accidents at LC decreased between 2013 and 2015:

⇨ Collisions with a road vehicle dropped -18%;

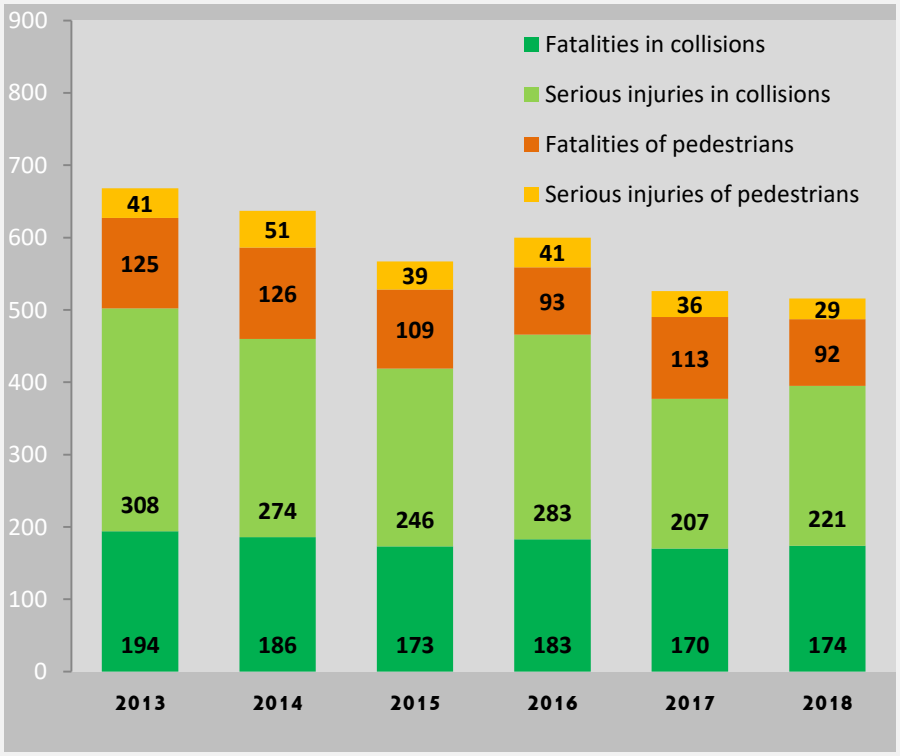
⇨ Accidents involving pedestrians and cyclists decreased -11%.

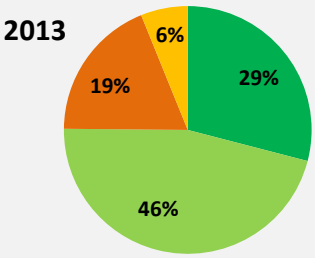
Nevertheless, there is no improvement observed after 2015: 450 events in 2015, 454 events in 2016, 446 events in 2017 and 421 in 2018.

The split of victims shows an relative increase of fatalities in collisions (see graph below).

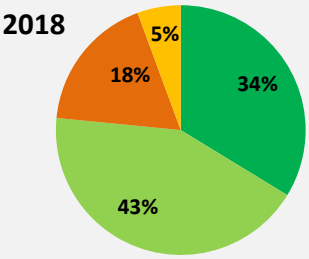


2.16b Victims of accidents at level crossings





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



Part 3

Focus on individuals hit at station

Part 3 - Focus on individuals hit at station

3.01 Number of accidents

3.02 Number of victims

3.03 Split of victims, established members

3.04 Split of victims, new members

3.05 Trespassers, established members

3.06 Pedestrians, established members

3.07 Staff, established members

3.08 Type of train

3.09 Seasonality, month

3.10 Seasonality, day of the week

3.11 Seasonality, hour

3.12 Seasonality, time interval

3.13 Safety measures taken at station

3.14 Safety measures preventing people being hit on platform

3.15 Safety measures preventing people being hit on track

3.01 Number of accidents

This graph includes accidents that occurred to staff members, persons on platforms or persons that fell from platform to the track (both called 'pedestrians' in the next graphs) and persons walking or crossing the tracks (trespassers).

Accidents occurring at level crossings inside stations are excluded.

3.02 Number of victims

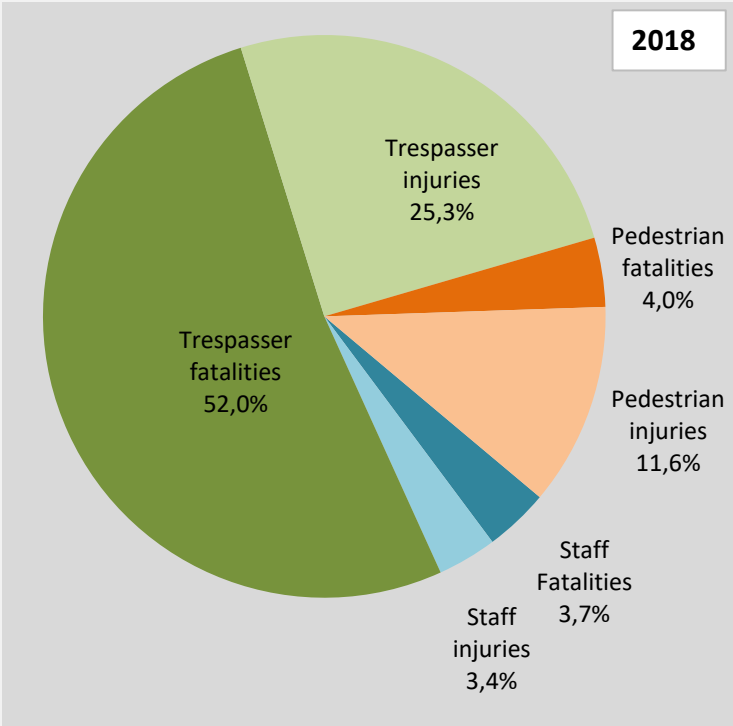
Most accidents are individual events.

Split of accidents by number of victims in 2018:

Established members	
1 victim	345
2 victims	2
3 victims	1

New members	
1 victim	791
2 victims	10
3 victims	5

3.03 Split of victims, established members



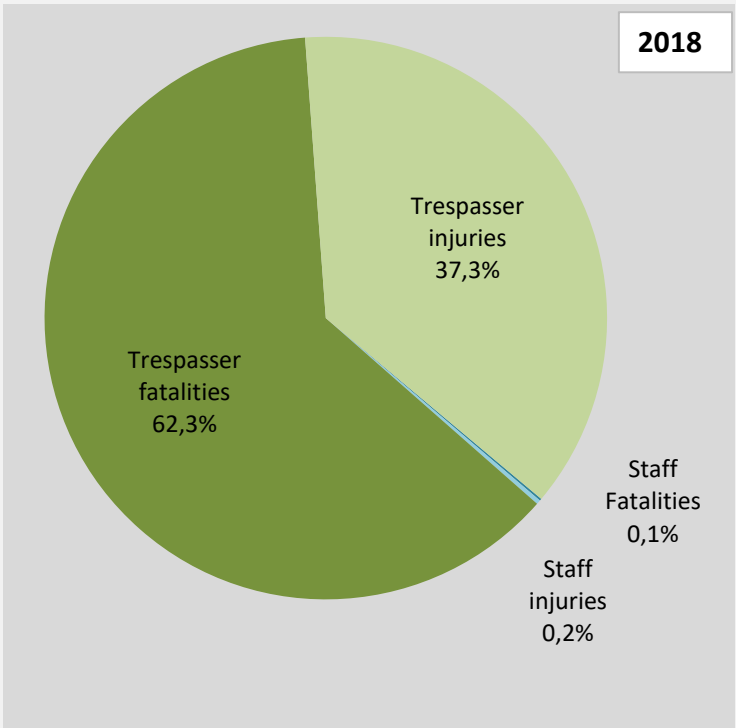
As a whole, trespassers roughly represent 80% of victims: 82% in 2014 and 2016, 77% in 2018.

Trespasser fatalities represent half of victims. This ratio is stable along the years (it was 46% in 2017 and 49% on the 2013-2017 period).

There are 2 trespasser fatalities for 1 serious injury.

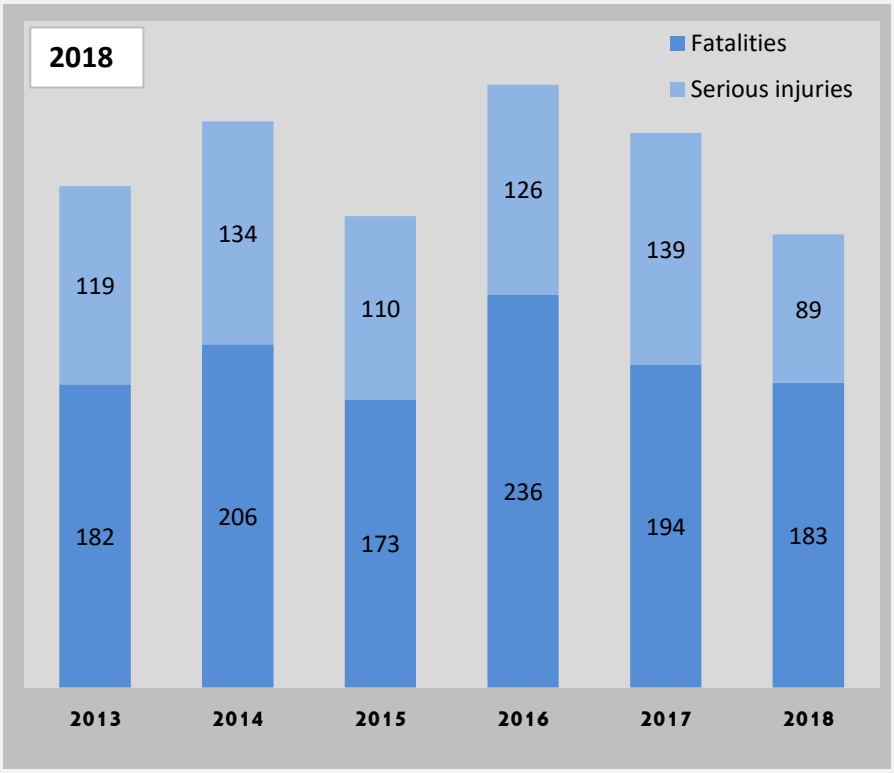
On the contrary, there are far more serious pedestrian injuries than fatalities.

3.04 Split of victims, new members

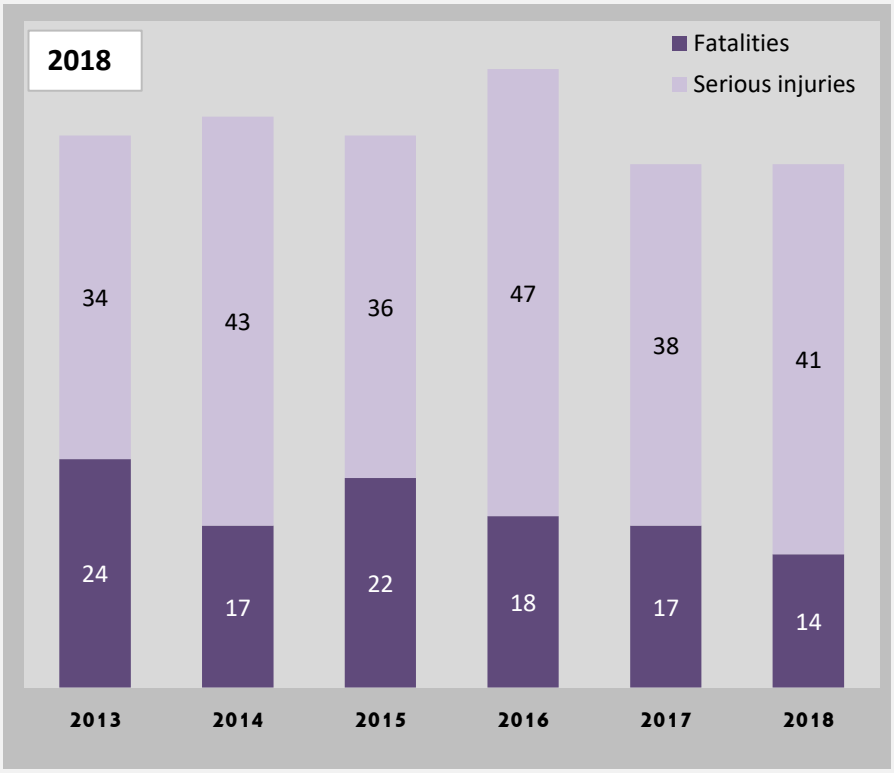


New members are not familiar with definitions in use for the Safety database. This might explain the absence of the 'pedestrian' category.

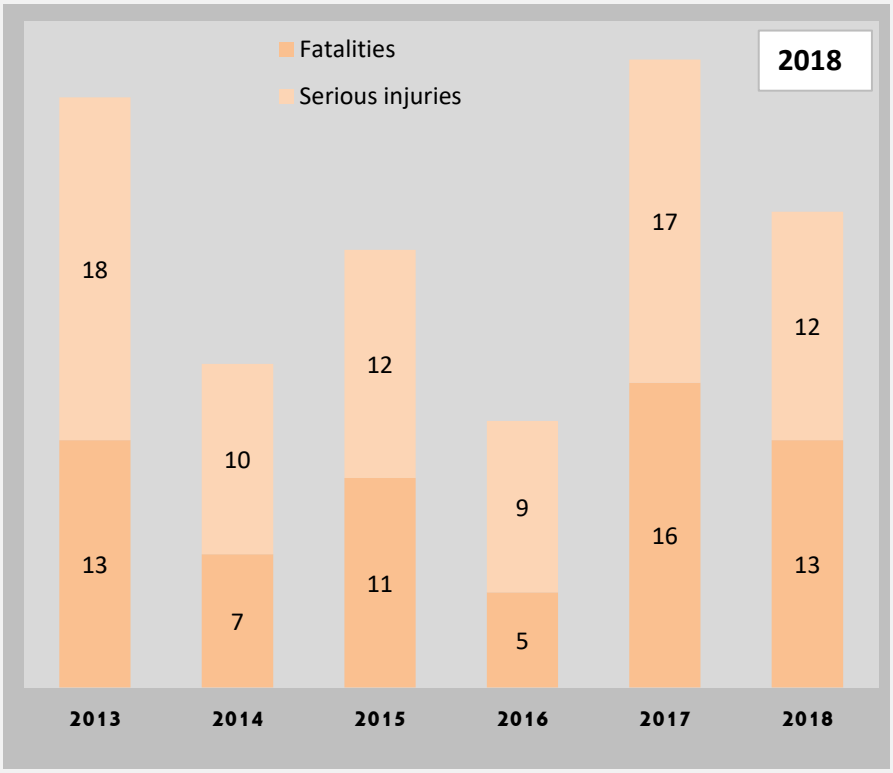
3.05 Trespassers, established members



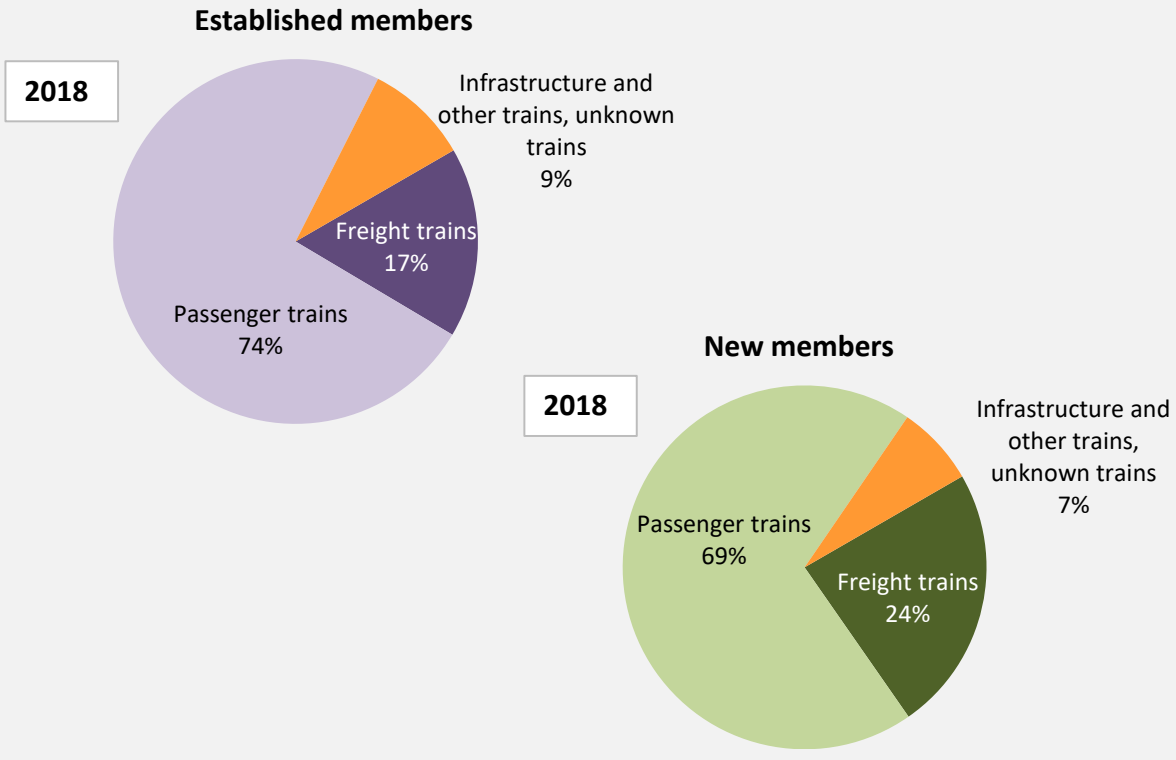
3.06 Pedestrians, established members



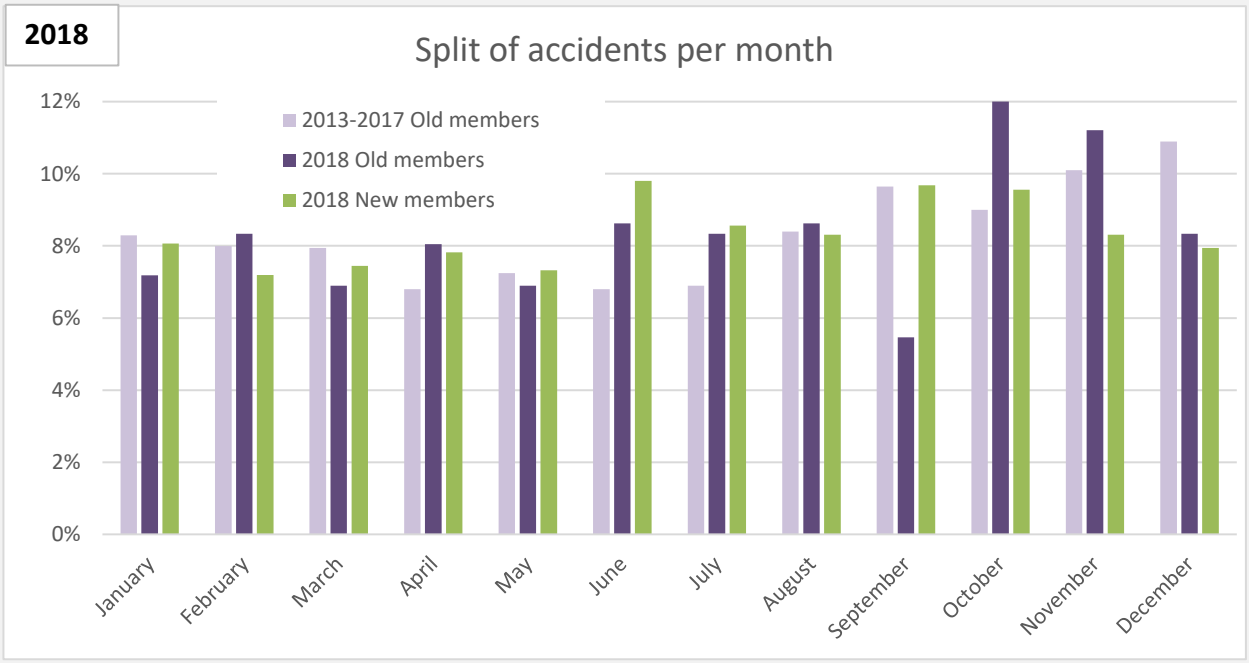
3.07 Staff, established members



3.08 Type of train

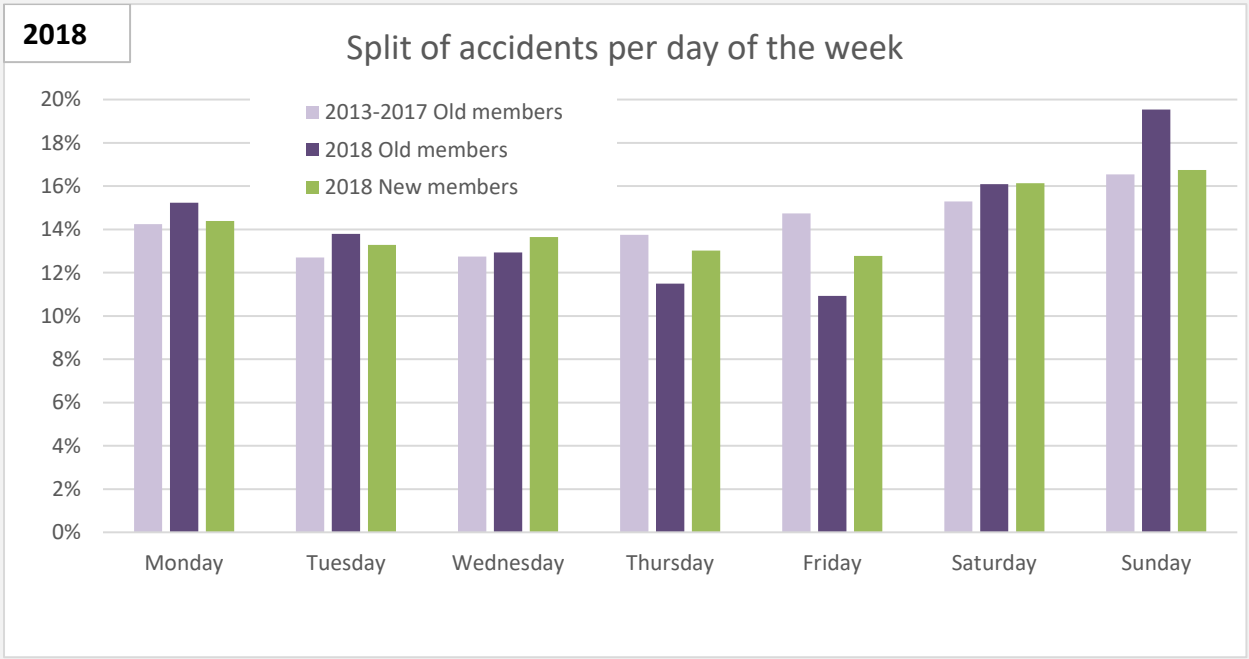


3.09 Seasonality, month



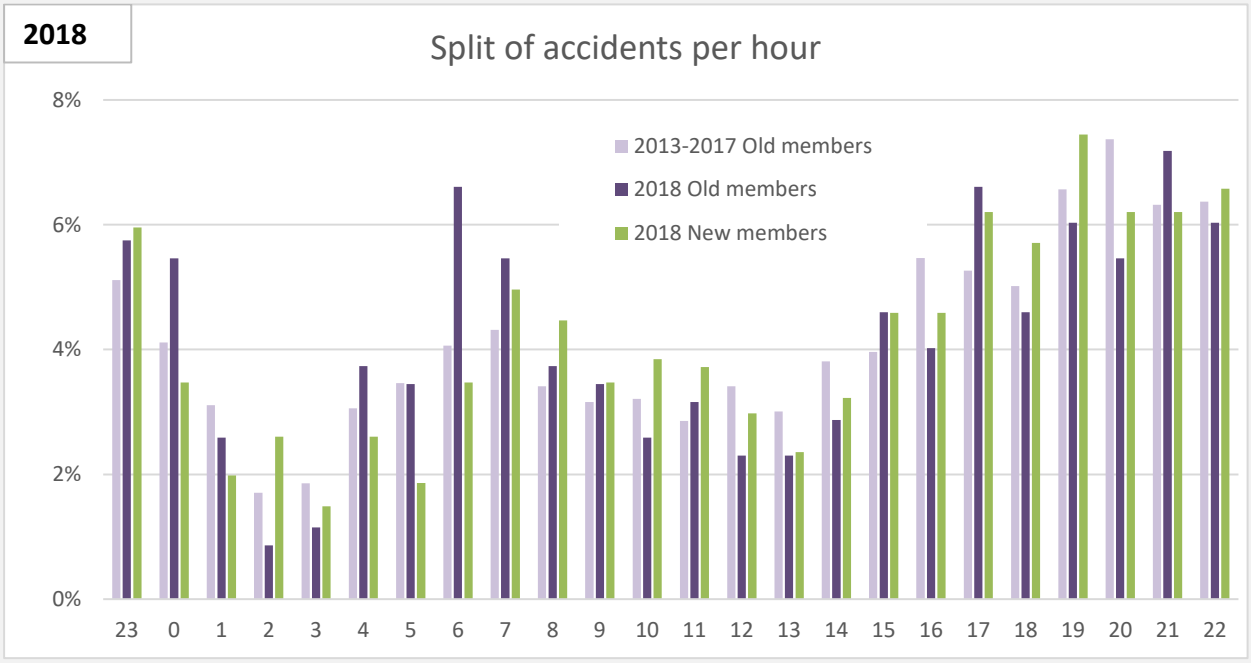
The number of reported incidents of people being struck by a train at a station are higher during the latter part of the year, this may be due to greater hours of darkness during these months. This is also reflected in 3.11 and 3.12 which show a greater percentage of incidents occurring in the evening and at night.

3.10 Seasonality, day of the week

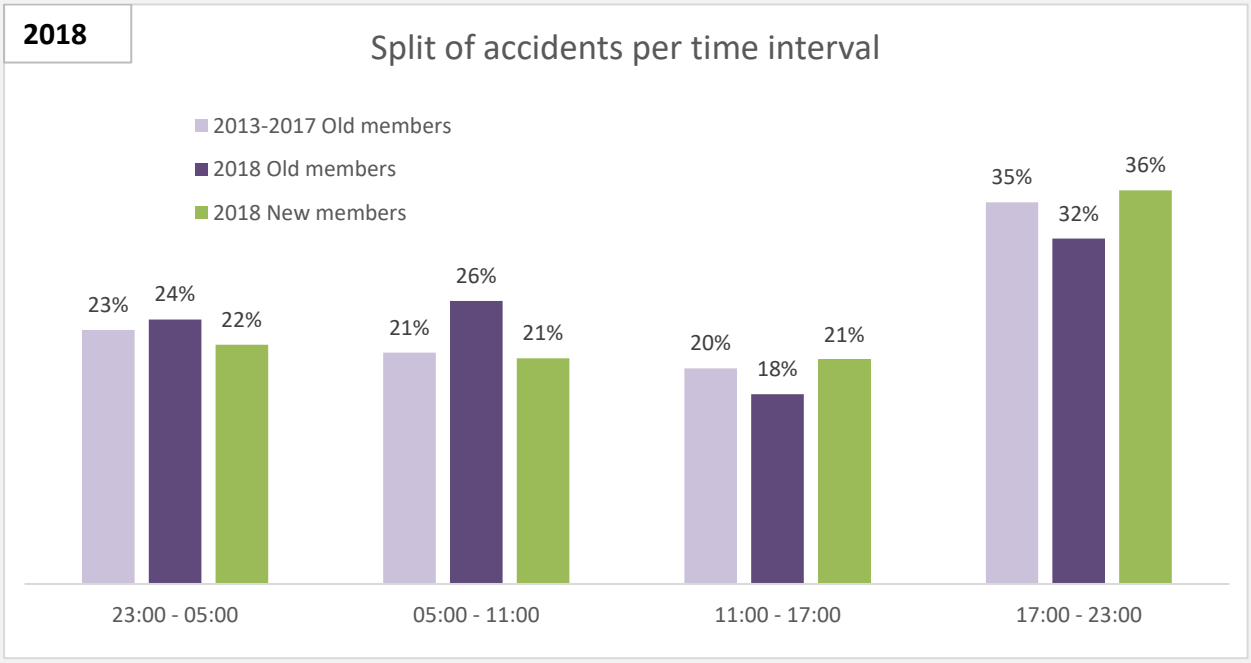


The graph highlights that a greater percentage of events occur at the weekend. This may be due to the passenger profile (more unfamiliar passengers) travelling at this time.

3.11 Seasonality, hour



3.12 Seasonality, time interval



3.13 Safety measures taken at station

ANNOUNCEMENT IN STATION

Audible warnings:

◊ warning for departing train

◊ warning for incoming train

◊ warning for passing train

◊ warning for hazardous conditions: ice, water

◊ warning for general safety: platform edge, run

Visible warnings on electronic display on platform:

◊ warning for departing train

◊ warning for incoming train

◊ warning for passing train

◊ warning for hazardous conditions: ice, water

◊ warning for general safety: platform edge, run

CCTV surveillance:

◊ followed by specific announcements

PLATFORM DESIGN

◊ concave platform alignment (preventing wheeled object to roll of the platform into the tracks)

◊ removing obstacles close to the edge of the platform

◊ enlarging platforms in busy stations

◊ signs: information display, e.g. narrow platform, end of platform/no trespassing

◊ yellow line (or other colour) distance from edge

◊ sign for traindriver to know where to stop along the platform

◊ visual impairment designs, tactile pavement

COMMUNITY SUPPORT, SAFETY CAMPAIGNS

◊ schools

◊ internet

◊ other

STAFF PRESENCE

◊ on train (open door, look if passengers want to get out as the train is departing)

◊ on pedestrian crossings

◊ on platform

DISPATCHING PROCESS

◊ all doors closed

◊ one door open

ANNOUNCEMENT IN TRAIN

◊ side for desembarking

◊ "take care when alighting", "mind the gap…", …

PASSING TRAINS

◊ horn warning

◊ limited speed

TRAIN DESIGN

◊ interlocking doors

◊ one side opening only

3.14 Safety measures preventing people being hit on platform

CFL

- Safe distance from platform edge marked by a line on the platform
- Tannoy announcements warning of non-stopping services passing through

DB AG

- Hatching and tactile paving on danger/keep-clear areas of platforms
- Targeted public information and awareness-raising via media campaign (YouTube, press): "Wir wollen, dass du sicher ankommst" (We want you to arrive safely)

EUROTUNNEL

Setting up fences and rehanced security (security company and police force)

INFRABEL

Platform heightening

IP

- Safety awareness campaign among railway users and population.
- Installation of active protection systems, with visual and acoustic warnings.
- Installation of warning plate signals advising for the danger concerning approaching trains.
- Operational measures to protect railway workers on (or near) tracks, such as a safety guard to warn the working teams on field, implementation of speed restriction and automatic approach warning systems.

ÖBB

- Safety in the railway environment
- Platform programme

RFI

The Infrastructure manager is improving the current plan to avoid the access to the tracks by the passengers using trains-synchronized sound alerts and also safety signs.
Awareness-raising campaigns by the media to train passenger

SBB

- Tactile and reflective safety lines indicate the safe waiting zones on all platforms
- Improvement of the passenger flow throughout the whole station and clear all of obstacles in the area

SNCF Réseau

Brightly-coloured signs, tannoy announcements warning of non-stopping services passing through and awareness-raising campaign warning people not to stand in the danger area.

SZDC

- public education
- color-coded verges of platforms
- passengers warning if a train is approaching

ZSR

- Construction of overpasses/underpasses to platforms
- Pathways between platforms on open track stations equipped with active LC system
- Information for passengers about train departures and passing trains
- Information for passengers about passing trains near platforms
- Dangerous places at platforms are marking according appropriate technical standards

3.14 Safety measures preventing people being hit on platform (follow)

UNITED KINGDOM

- Safe distance from the platform edge marked with a yellow line on most platforms
- Safe distance from the platform edge marked by tactile paving on many platforms
- Audible warnings for platform safety
- Announcements to warn of non-stopping services
- Visual warnings for platform safety
- Targeted awareness campaigns for passengers and public
- Operational measures for safe train dispatch
- Mass media communication about unwanted behaviour around the tracks
- Design of rolling stock to prevent people hanging on trains

3.15 Safety measures preventing people being hit on track

CFL

- Access to track prohibited
- Fencing to be put up to protect known hotspots

DB AG

Targeted public information and awareness-raising via media campaign (YouTube, press): "Wir wollen, dass du sicher ankommst" (We want you to arrive safely)

EUROTUNNEL

Setting up fences and rehanced security (security company and police force)

INFRABEL

Technical measures:
- Installation of 17.73km of fencing in hotspots
- Installation of rubber anti-trespass panels
- Installation of "no crossing the tracks" signs

Awareness-raising measures:
- Design competition for university & post-secondary students: 'Ta vie vaut un détour' (Your life's worth going the long way round). The winning designs have been distributed on postcards via the Boomerang network.
- 'Ne marchez jamais sur les voies' (Keep off the tracks) campaign aimed at the general public. The campaign comprised a press release and a campaign across various media channels: Facebook and YouTube inserts, advertising spots in cinemas, and a poster campaign via the Publifer network.
- Interactive course module on the dangers of trespassing, aimed at teenagers (12 - 18 years) and taught by I-CPA in collaboration with SPC and Securail. The secondary schools targeted were selected based on their proximity to the railway and/or reports that their pupils were regular trespassers.
- Continuation of Securail and SPC checks, including both preventive and enforcement components, as well as a "Railway safety" Facebook page providing much useful feedback on our (safety) campaigns and measures.
- Yellow safety line or tactile lines (depending on whether or not the platform is renovated)
- Awareness-raising campaigns (by Infrabel) in schools near hotspots stations
- Prohibitive Signs on the platform

IP

- Safety awareness campaign among railway users and population.
- Installation of warning plate signals for the prohibition walking on tracks and advising for the danger concerning running trains.
- Installation of fences / barriers in urban areas and high speed tracks.
- Operational measures to protect railway workers on (or near) tracks, such as a safety guard to warn the working teams on field, implementation of speed restriction and automatic approach warning systems.

ÖBB

- Safety in the railway environment
- Safe execution of track works
- Safety competence programme

3.15 Safety measures preventing people being hit on track (follow)

PRORAIL

- Procedure for traindrivers to report inadequate fences, large animals and unauthorized persons along the tracks, followed by slowing of trains, report to the police, repair of fence
- For the prevention of suicide we developped a training for railway-staff (following a british example) to recognize potentially suicidal persons and act on this
- NEW: For the prevention of suicide we developped a training for railway-staff (following a british example) to recognize potentially suicidal persons and act on this
- Proper fences and other measures to prevent unauthorized entrance. All track areas are scored for possible security riscs and with that score put into Basic Security Level 1 (normal) or 2 (high). Given local special situations extra measures can be used to mitigate these special riscs.
- NEW: Proper fences and other measures to prevent unauthorized entrance. All track areas are scored for possible security riscs and with that score put into Basic Security Level 1 (normal) or 2 (high). Given local special situations extra measures can be used to mitigate these special riscs.
- Surveillance and fining of tresspassers
- Mass media communication about unwanted behaviour around the tracks
- Design of rolling stock to prevent people hanging on trains

RFI

The Infrastructure manager is improving the current plan to avoid the access to the tracks by the unauthorized persons crossing the tracks. The Infrastructure Manager has recently requested to the Ministry Of Transportation to increase the value of the penalty provided by the norm for the unauthorized persons.
Identification of critical points on existing lines and implementation of specific mitigative measures (for exemple, fences, etc.)

SBB

Prohibitive signs for all track areas on the station and in between the platforms

SNCF Réseau

- Policy for delimiting railway property, signage
- Crossing prohibited unless authorised by a member of staff. Trials underway into "chicane" crossings & pictograms with audio. Platform access controlled by a member of staff. Prohibition of at-grade track crossings (replace with bridges/tunnels)

SZDC

- Public education
- Fences and acoustic barriers construction in residential areas

UNITED KINGDOM

- Fencing
- Warning signs
- Targeted awareness campaigns

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 2019

Significant Accidents 2018

Report available on the UIC website

http://safetydb.uic.org

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