

2. Occurred status of the accidents

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Two third of the derailment accidents were caused by the level crossing or the natural disaster, etc. However, among the other accidents caused by the maintenance and the handling by the railway operators, ratio of the accidents caused by the maintained status of the ground facilities such as the tracks, was large, in addition, the ratio of the local railway operator* was high.

* Local railway operator is the medium and small-scale private railway company, and the third sector operator who succeeded the designated local railways of the former Japan National Railway, and the conventional lines parallel to the projected Shinkansen lines.

The probable causes of the 190 derailment accidents, occurred in the past 16 years, were classified based on the accident investigation reports.

The "level crossing accident" such as the collision with automobile which had entered the level crossing, and the "natural disaster" such as the vehicle ran over the earth and sand flown from the collapsed slope in the track side, were 125 accidents, 66 %, *i.e.*, the two thirds.

In addition, 65 derailment accidents, 34 %, were caused by "maintained status of the ground facilities such as the track" and "handling operation" of the railway operators.

These 65 derailment accidents caused by railway operator were classified as follows.

- Track : 33 accidents, 51 %, related to maintained status of ground facilities such as track.
- Works in the track : Three accidents, 5 %, related to the construction works in the track.
- Vehicles : Seven accidents, 11 %, related to the maintained status of vehicles.
- Operation : 14 accidents, 22 %, related to the handling operation.
- Loading/unloading works : Two accidents, 3 %, related to the handling of loading and unloading works.
- Conflicting : Six accidents, 9 %, were caused by conflicting plural factors in worse direction.

It was cleared that 33 accidents, 51 %, caused by the track were the dominant. Refer to Table 2.

From the view point of railway operators, 68 accidents, 36 %, occurred in the local railway operators among total 190 accident subjected to the investigation. In contrast, 27 accidents, 82 %, in the 33 derailment accidents caused by the track, occurred in the local railway operators. Refer to Table 2.

Table 1. Occurred status of derailment accident, changes per year

	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	Total
Total railway accident to be investigated	20	23	20	24	16	19	13	11	9	14	20	15	14	13	23	19	273
Derailment accident	14	20	19	21	13	14	7	5	6	12	15	12	9	6	8	9	190
Ditto, caused by track	2	2	2	1	2	3	4	1	0	1	3	3	1	2	3	3	33
Ditto, in local railway operator	2	2	2	0	2	3	2	1	0	0	2	2	1	2	3	3	27

Table 2. Occurred status of derailment accident, classified by the category

	Caused by maintenance and handling of railway operators							The other causes					Gross	
	Track	Works in track	Vehicle	Operation	Load/unload works	Conflicting	Total	Level crossing	Against road traffic	Traffic accident	Natural disaster	Total		
Derailment accident	33	3	7	14	2	6	65	48	5	4	68	125	190	<= Ratio in gross <= Ratio in category
	51%	5%	11%	22%	3%	9%	-	38%	4%	3%	54%	-		
Derailment accident in local railway operator	27	0	1	8	1	0	37	16	5	0	10	31	68	<= Ratio in gross <= Ratio of local operators
	82%	0%	14%	57%	50%	0%	57%	33%	100%	0%	15%	25%	36%	

* "Accident against road traffic" is the accident that the tramway collides with the automobiles, etc., on the road except for level crossing.

* "Traffic accident" is the accident caused by that the train collided with automobile or the freight of automobile fallen in the railway track, by the effects of the accident of automobiles, etc., except for the level crossing accident and the accident against road traffic.

The 27 derailment accidents caused by the railway track, occurred in local railway operators, were classified in detail as follows. Refer to Table 3.

- 10 accidents were caused by the gauge widening.
- One accident was caused by the rail broken.
- 12 accidents were caused by the track irregularities and the incomplete switching of turnout.
- Four accidents were caused by the track irregularities, etc., except for that described in the above.

Particularly, four accidents among 10 accidents, caused by the gauge widening, occurred in the period from October 2016 to May 2017. Refer to Figure 2.

Table 3. Precise classification of the derailment accident caused by the railway track

Classification of causes of the track	Gauge widening	Rail broken	Turnout	Others	Total
Accidents caused by railway track	11	1	14	7	33
Among the above, occurred in local railway operator	10	1	12	4	27
	91 %	100 %	86 %	57 %	82 %

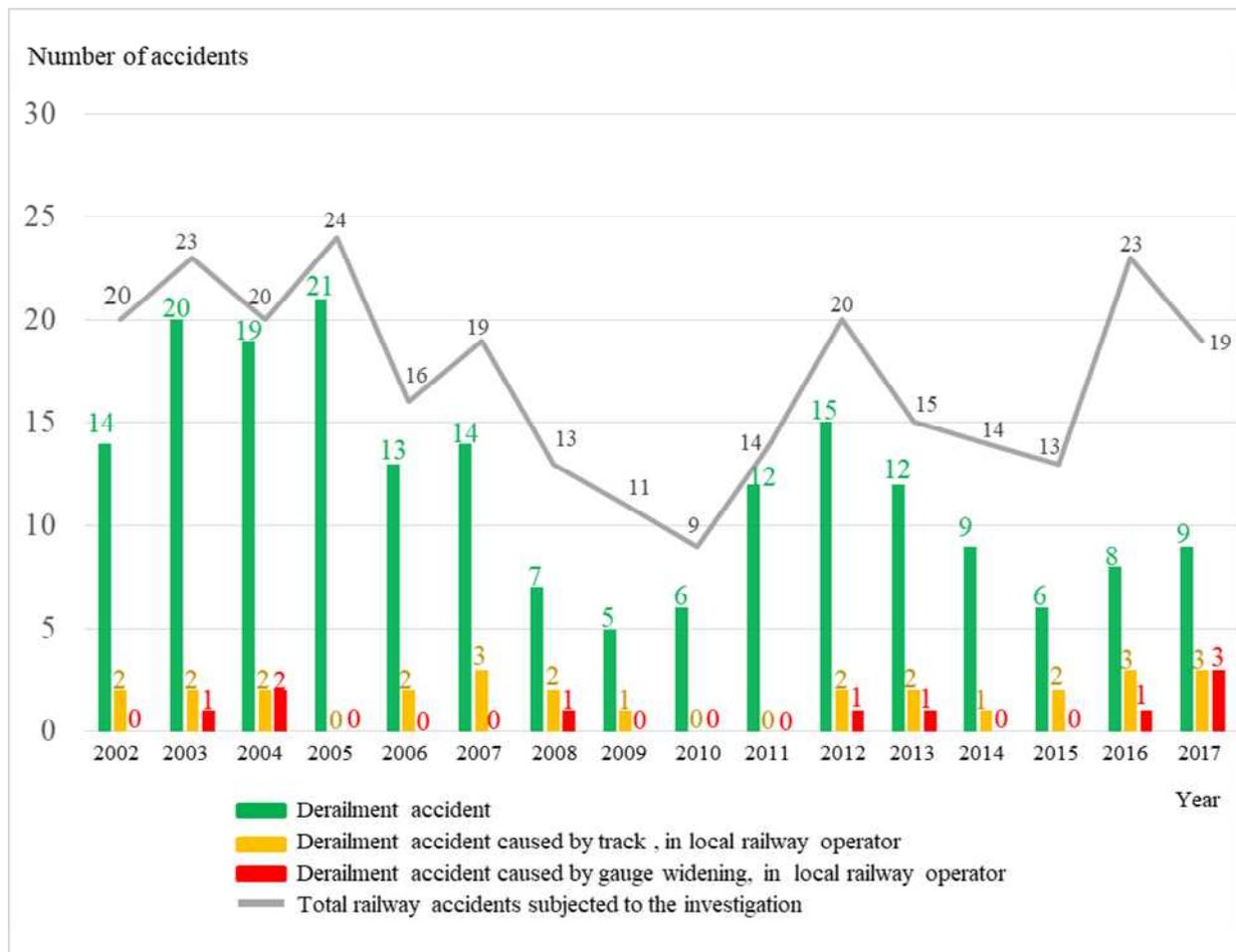


Figure 2. Changes of number of the derailment accidents.

Status of local railway operators in entire derailment accidents caused by the railway track.