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INDIAN RAILWAYS – SAFETY PERFORMANCE

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INDIAN RAILWAYS – SAFETY PERFORMANCE

The Indian Railway is the world's largest Railway. It is quite unique distinctive in character, really a microcosm of India. To make it a safe and reliable system is an enormous challenge. Safety on the Railways is the end product of the cohesive fusion of its myriad parts.

The term 'accident' envelopes a wide spectrum of occurrences with or without significant impact on the system. Consequential train accidents include mishaps with serious repercussion in terms of loss of human life or injury, damage to railway property or interruption to rail traffic in excess of laid down threshold levels and values. These consequential train accidents may be due to collisions, derailments, fire in trains, road vehicles colliding with trains at level crossings, and certain specified types of 'miscellaneous' train mishaps.

Accident Related Data

Indian Railways accord highest priority to safety in train operations. The number of Consequential train accidents decreased from 104 during 2016-17 to 73 during 2017-18. The number of train accidents per million train kilometers, which is a universally accepted safety index decreased from 0.09 in 2016-17 to 0.06 in 2017-18. The Table below gives details of train accidents on Indian Railways since 1960-61:

Table 1: Train Accidents on Indian Railways since 1960-61

Year	Colli-Sions	Derail-ments	Level crossing accidents	Fire in trains	Misc.	Total	Move-ment of traffic i.e., Train Kms. Run (in Million)	Incidence of train accidents per Million train Kms.
1970-71	59	648	121	12	--	840	466.5	1.8
1971-72	57	667	118	22	--	864	474.4	1.8
1972-73	57	598	131	25	--	813	473.1	1.7
1973-74	59	578	125	13	--	782	432.8	1.8

Year	Colli-Sions	Derail-ments	Level crossing accidents	Fire in trains	Misc.	Total	Move-ment of traffic i.e., Train Kms. Run (in Million)	Incidence of train accidents per Million train Kms.
1974-75	66	696	140	23	--	925	430.1	2.2
1975-76	64	768	105	27	--	964	487.4	2.0
1976-77	45	633	86	16	--	780	511.6	1.5
1977-78	54	705	93	14	--	866	526.1	1.6
1978-79	55	778	86	12	--	931	504.1	1.8
1979-80	72	692	115	21	--	900	503.4	1.8
1980-81	69	825	90	29	--	1013	504.5	2.0
1981-82	87	936	84	23	--	1130	516.6	2.2
1982-83	54	653	70	20	--	797	530.9	1.5
1983-84	48	621	82	17	--	768	541.7	1.4
1984-85	39	678	65	30	--	812	541.1	1.5
1985-86	46	588	62	21	--	717	570.4	1.3
1986-87	28	538	65	13	--	644	582.3	1.1
1987-88	40	490	62	12	--	604	590.2	1.02
1988-89	30	457	55	3	--	545	602.2	0.90
1989-90	34	456	42	8	--	540	618.0	0.87
1990-91	41	446	36	9	--	532	617.1	0.86
1991-92	30	444	47	9	--	530	629.2	0.84
1992-93	50	404	51	9	--	524	632.3	0.83
1993-94	50	401	66	3	--	520	634.2	0.82
1994-95	35	388	73	5	--	501	641.9	0.78
1995-96	29	296	68	5	--	398	655.9	0.61
1996-97	26	286	65	4	--	381	667.6	0.57
1997-98	35	289	66	6	--	396	675.8	0.58
1998-99	24	300	67	6	--	397	686.9	0.58
1999-2000	20	329	93	21	--	463	717.7	0.58
2000-01	20	350	84	17	2	473	723.8	0.65
2001-02	30	280	88	9	8	415	756.4	0.55
2002-03	16	218	96	14	7	351	786.2	0.44
2003-04	9	202	95	14	5	325	790.8	0.41
2004-05	13	138	70	10	3	234	810.14	0.29
2005-06	9	131	75	15	4	234	825.4	0.28
2006-07	8	96	79	4	8	195	847.8	0.23
2007-08	8	100	77	5	4	194	890.5	0.22
2008-09	13	85	69	3	7	177	905.2	0.20
2009-10	9	80	70	2	4	165	997.2	0.17
2010-11	5	80	53	2	1	141	1005.9	0.14

Year	Colli-Sions	Derail-ments	Level crossing accidents	Fire in trains	Misc.	Total	Move-ment of traffic i.e., Train Kms. Run (in Million)	Incidence of train accidents per Million train Kms.
2011-12	9	55	61	4	2	131	1077.0	0.12
2012-13	6	49	58	8	-	121	1109.7	0.11
2013-14	4	53	59	7	3	117	1096.00	0.10
2014-15	5	63	56	6	5	135	1166.70	0.11
2015-16	3	65	35	0	4	107	1144.19	0.10
2016-17	5	78	20	1	0	104	1173.50	0.09
2017-18	3	54	3	13	0	73	1170.74	0.06
2018-19 (upto 31 May 2018)#	0	8	2	2	1	13	*	*

*Under compilation. **Source:** Compiled on information provided by M/o Railways as per availability.

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Casualties

The position of casualties in consequential Train accidents since 2004-05 and onwards has been given in the following table.

Table 2: Casualties

Year	Number of Passengers		Total Casualties per million passengers carried
	Killed	Injured	
2000-01	55	286	0.01
2001-02	144	595	0.02
2002-03	157	658	0.03
2003-04	135	302	0.03
2004-05	50	191	0.04
2005-06	315	627	0.165
2006-07	208	402	0.098
2007-08	191	412	0.092
2008-09	209	444	0.094
2009-10	238	397	0.088
2010-11	235	358	0.078
2011-12	100	586	0.083
2012-13	60	270	0.039
2013-14	42	94	0.02
2014-15	118	340	0.05
2015-16	40	126	0.02
2016-17	195	346	0.07
2017-18	28	184	*
2018-19 (upto 31 May 2018)#	1	5	*

*Under compilation. **Source:** Compiled on information provided by the Ministry of Railways as per availability.

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Causes of Train Accidents

Of the total of 73 train accidents that occurred on Indian Railways during 2017-18, 62 (85 percent) were due to human failure, including 44 (60.3 percent) due to the failure of railway staff and 18 (24.7 percent) due to the failure of other than railway staff, 2(2.74 percent) accidents due to failure of equipments, 2 (2.74 percent) accidents were caused due to Sabotage, 2(2.74) accidents were due to combination of factors and 5 (6.85 percent) accidents were due to incidental factors.

The table below shows the broad causes of train accidents which occurred on Indian Railways since 2000-2001:

Table 3: Broad Causes of Train Accidents

Years	Failure of Railway Staff	Failure of Persons other than Railway Staff	Failure of Equipments			Sabotage	Combination of factors	Incidental	Causes could not be established	Under investigation	Grand Total
			Rolling Stock	Track	Electrical/S&T						
2000-2001	293 (62)	109	16	17	-	19	4	11	4	-	437
2001-2002	248 (67)	103	11	13	-	14	-	20	5	1	415
2002-2003	186 (53)	118	6	11	1	10	2	15	2	-	351
2003-2004	161 (50)	107	6	9	3	18	2	17	2	-	325
2004-2005	119 (51)	78	5	7	2	4	1	16	2	-	234
2005-2006	120 (51)	86	1	6	1	5	-	11	3	1	234
2006-2007	85 (44)	84	4	5	-	8	1	7	-	1	195
2007-2008	85 (43.81)	71	4	3	2	7	-	8	1	3	194
2008-2009	75 (42.37)	75	-	-	-	13	4	4	4	2	177
2009-2010	63 (38.18)	75 (45.45)	3	3	-	14	1	4	2	2	165
2010-11	56 (39.72)	57 (40.43)	-	5	-	16 (11.35)	3 (2.12)	4 (2.83)	-	-	141
2011-12	52 (39.69)	63 (48.10)	-	5	-	6 (4.58)	1 (0.76)	3 (2.29)	1 (0.76)	-	131
2012-13	45 (37.18)	59 (48.76)	-	6	-	3 (2.48)	-	7 (5.79)	1 (0.83)	-	121
2013-14	50 (42.73)	55 (47)	-	3	-	4 (3.42)	-	4 (3.42)	-	1 (0.85)	117
2014-15	60 (44.44)	58 (42.96)	-	4 (2.96)	-	3 (2.2)	-	8 (5.92)	2 (1.48)	-	135
2015-16	55 (51.40)	38 (35.51)	-	2 (1.86)	-	1 (0.09)	1 (0.09)	9 (8.41)	1 (0.09)	-	107
2016-17	64 (61.54)	22 (21.15)	-	2 (1.92)	-	2 (1.92)	3 (2.88)	7 (6.73)	-	4 (3.85)	104
2017-18	44 (60.3)	18 (24.7)	-	2 (2.74)	-	2 (2.74)	2 (2.74)	5 (6.85)	-	-	73
2018-19 (upto 31 May 2018)#	6 (46.2)	3 (23.1)	-	-	-	-	-	1 (7.7)	-	3 (23.1)	13

Provisional Figures Source: Compiled on information provided by the Ministry of Railways as per availability.

Collisions and Derailments:

The position regarding total number of collisions and derailments and those caused by the failure of railway staff since 2000-01 is given in the following table:

Table 4: Collisions and Derailments

Year	Number of collisions and derailments	No. of collisions and derailments attributed to failure of railway staff	Percentage
2000-01	370	280	76
2001-02	310	--	--
2002-03	232	182	78
2003-04	211	143	68
2004-05	151	110	73
2005-06	140	106	78
2006-07	104	75	72
2007-08	108	75	69.44
2008-09	98	64	65.30
2009-10	89	57	64.04
2010-11	85	51	60.00
2011-12	64	48	75
2012-13	55	37	67.2
2013-14	57	44	77.19
2014-15	68	52	76.47
2015-16	68	53	77.94
2016-17	83	63	75.90
2017-18	63	40	70.2
2018-19 (upto 31 st May 2018)#	8	4	50.0

Source: Compiled on information provided by the Ministry of Railways as per availability.

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Derailments

Year-wise number of consequential train derailments since 2000-2001 with percentage of the total consequential train accidents in each year are given below:

Table 5: Derailments

Year	Total Accidents	Derailments	Percentage
2000-01	473	350	75
2001-02	414	280	68
2002-03	351	216	62
2003-04	325	202	62
2004-05	234	138	59
2005-06	234	131	56
2006-07	195	96	49
2007-08	194	100	51.55
2008-09	177	85	48.02
2009-10	165	80	48.48
2010-11	141	80	56.74
2011-12	131	55	41.98
2012-13	122	49	40.16
2013-14	118	53	44.92
2014-15	135	63	46.67
2015-16	107	65	60.74
2016-17	104	78	75.00
2017-18	73	54	74.00
2018-19 (upto 31 May 2017)#	13	8	61.5

Source: Compiled on information provided by the Ministry of Railways as per availability.

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Damage to Railway Property

Details of the damage to railway property and interruption to communications caused by train accidents since 2000-01 are given below:

Table 6: Damage to Railway Property and Interruption to Communications

Year	Cost of Damage (Rs. in lakhs)		Interruption to through communication (in hours)
	Rolling Stock	Permanent Way	
2000-01	3693.0	1831.0	4,045
2001-02	3234.6	1647.0	3,224
2002-03	3158.4	617.3	2,388
2003-04	4348.6	826.0	2,806
2004-05	2225.0	497.1	1,691
2005-06	2443.4	941.5	1,904
2006-07	2321.7	871.3	1,148
2007-08	2970	1085.4	4380.52
2008-09	5011.9	1052.9	1420.08
2009-10	4216.48	1244.99	1105.01
2010-11	4584.52	1311.37	1455.05
2011-12	8210.49	771.99	1041.16
2012-13	4142.21	1281.78	1131.41

2013-14	2003.29	1798.61	745.38
2014-15	6313.06	894.45	946.27
2015-16	5089.42	834.33	923.05
2016-17	3554.24	2674.09	902.77
2017-18	*	*	*
2018-19 (upto 31 May 2018)	*	*	*

* under compilation

Source: Compiled on information provided by the Ministry of Railways as per availability.

Allocation of Funds

The Budgetary Allocation for Railway safety Related Activities and funds allocated under 'Railway Safety Fund' are given in the tables below:

Table 7: Budgetary Allocations for Railway Safety Related Activities

Year	Amount	
	Budget Estimate	Revised Estimate
2016-17	59970	63062
2017-18	68797	68724
2018-19	73065	----

Source: Compiled on information provided by M/o Railways as per availability.

Table 8: Year-Wise Allocation of Funds under 'Railway Safety Fund (RSF)'

Year	Amount (Rs. In crore) (RE)
2013-14	2000.00
2014-15	2200.00
2015-16	2661.40
2016-17	10780.00
2017-18	11375*
2018-19	----
Including RRSK*	10000.00

Source: Compiled on information provided by M/o Railways as per availability.

* In the Budget 2017-18, an exclusive fund called "Rashtriya Rail Sanraksha Kosh" (RRSK) has been made with a corpus of Rs. 1 lakh crore over a period of 5 years for giving a major boost to safety related works.

Accidents at Unmanned Level Crossings

The number of accidents/causalities, due to Unmanned Level Crossings in the country, from 2010-11 to 2017-18 and the current year 2018-19 (upto May 2018) are given in the following table:

Table 9: Accidents at Unmanned Level Crossings

Year	Number of Accidents at Unmanned Level Crossings	As percentage of total number of consequential train accidents
2010-11	48	34.04
2011-12	54	41.22
2012-13	53	43.44
2013-14	47	39.83
2014-15	50	37.04
2015-16	29	27.10
2016-17	20	19.23
2017-18	10	13.70
2018-19 (upto 31 May 2018)#	.01	7.70

Source: Compilation on information provided by the Ministry of Railways

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It is the endeavor of the Ministry of Railways to eliminate all Unmanned Level Crossings, in a phased manner, by either of the following:-

- Closure - Closing Unmanned Level Crossings having NIL/ negligible Train Vehicle Unit (TVU).
- Merger - Merger of Unmanned Level Crossing to nearby Manned/Unmanned Level Crossing or Subway/Road Under Bridge (RUB)/Road Over Bridge (ROB) by construction of diversion road.
- Provision of Subways/RUBs.
- Manning- Phased manning of unmanned level crossings which cannot be eliminated by the above means.

There are 19,507 Manned Level Crossings and 5792 Unmanned Level Crossings in the country as on 01.04.2018. State-wise number of Manned and Unmanned Level Crossings are given in the following table:

Table 10: Number of Manned and Unmanned Level Crossings

Sl. No.	State	As on 1.4.2015		As on 1.4.2016		As on 1.4.2017		As on 1.4.2018	
		Number of Manned Level Crossings	Number of Unmanned Level Crossings	Number of Manned Level Crossings	Number of Unmanned Level Crossings	Number of Manned Level Crossings	Number of Unmanned Level Crossings	Number of Manned Level Crossings	Number of Unmanned Level Crossings
1.	Andhra Pradesh	1071	453	1096	361	1140	272	1133	171
2.	Assam	609	202	708	225	771	141	821	72
3.	Bihar	1263	938	1293	898	1339	809	1380	742
4.	Chandigarh	4	0	4	0	4	0	4	0
5.	Chattisgarh	280	88	286	61	285	40	265	25
6.	Delhi	32	1	32	1	31	1	28	1
7.	Goa	10	0	10	0	10	0	10	0
8.	Gujarat	1555	2052	1534	1985	1543	1895	1564	1700
9.	Haryana	603	182	590	159	602	92	579	48
10.	Himachal Pradesh	50	6	49	6	49	6	50	4
11.	Jammu & Kashmir	34	1	34	1	34	1	34	1
12.	Jharkhand	471	221	486	172	511	113	525	34
13.	Karnataka	704	382	727	300	702	253	711	179
14.	Kerala	451	9	440	7	431	7	425	0
15.	Madhya Pradesh	1179	518	1104	452	1019	382	982	255
16.	Maharashtra	1244	413	1249	335	1236	268	1169	214
17.	Manipur	1	0	0	0	0	0	0	0
18.	Mizoram	1	0	1	0	1	0	1	0
19.	Nagaland	1	0	1	0	1	0	1	0
20.	Odisha	539	497	601	370	687	223	723	125
21.	Puducherry	19	4	20	3	21	2	21	2
22.	Punjab	1037	436	1026	395	1024	334	998	228
23.	Rajasthan	1323	1022	1292	940	1263	805	1194	464
24.	Tamil Nadu	1336	702	1374	611	1390	444	1429	269
25.	Telangana	413	86	423	72	421	37	420	9
26.	Tripura	11	7	15	0	15	0	15	0
27.	Uttar Pradesh	3219	1466	3226	1357	3180	1112	3165	912
28.	Uttarakhand	144	56	145	47	147	35	153	23
29.	West Bengal	1443	698	1501	582	1623	429	1707	314
	Total	19047	10440	19267	9340	19480	7701	19507	5792
		29487		28607		27181		25299	

Source: Compilation on information provided by the Ministry of Railways

Accident Compensation

The scale of compensation as specified in Railway Accident and Untoward Incidents (Compensation) Amendment Rules, 2016 is `800,000/- for death and `64,000/- to `800,000/- for injury depending upon the gravity of injury. . The amount of compensation paid to the victims for deaths/injury in train accidents from the year 2000-01 and onwards is given in the following table:

Table 11: Compensation paid by Railways[@]

Year	Compensation Paid
2000-01	886.12
2001-02	482.46
2002-03	489.19
2003-04	757.07
2004-05	513.16
2005-06	221.63
2006-07	500.89
2007-08	121.37
2008-09	218.94
2009-10	265.81
2010-11	585.79
2011-12	510.77
2012-13	319.63
2013-14	149.22
2014-15	127.48
2015-16	262.96
2016-17	303.17
2017-18	188.52
2018-19 (upto 31 May 2018)#	47.64

@ The amount of compensation paid during the year relates to the number of cases settled and payment made during that year and not the accidents that occurred during the year

* under compilation **Source:** Compiled on information provided by the Ministry of Railways as per availability.

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Mission 'Zero-Accident'

In the Railway Budget 2016-17, Mission Zero Accident was announced, comprising of the two sub-missions:

1. *Elimination of Unmanned Level Crossings:* As on 01.04.2017, Indian Railways have 27181 Level Crossings, out of which 19480 are manned and 7701 are unmanned. Out of total 7701 unmanned level crossings, 4943 level crossings are on BG (Broad

Gauge). It has been planned to eliminate unmanned level crossings (UMLCs) on Broad Gauge by 2020. Year-wise target fixed for elimination is as under:

Year	No. of UMLCs to be eliminated
2017-18	1500
2018-19	1500
2019-20	1943

2. *TCAS (Train Collision Avoidance System)*: To prevent collisions and signal passing at danger by the Loco Pilot through developing an indigenous technology and also to increase throughput by increasing average sectional speed on Indian Railways (IR).

In order to improve signaling, electrical/electronic interlocking system with centralized operation of points and signals are being provided to eliminate human failure and to replace old mechanical systems. Superior and safer Linke Hofmann Busch (LHB) Coaches having anti-climbing features have been progressively introduced on Indian Railways to reduce the fatalities in case of accidents.

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