Railway Accidents in India and Their Rectification.

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1.Abstract

This paper reviews the statistics of rail safety in India. The Railways in India have grown on parameters like infrastructure, expenditure and freight, however the statistics for accidents have increased exponentially. The accidents are mostly because of Human errors and Equipment defects. The percentages of types of accidents like derailments, collisions, Fire accidents in train, accidents near Level crossing and the fatality rates are discussed in this paper. The preventive steps for the rail accidents has been discussed in this paper.

Key words: Derailments, Collisions, fire in train, Level Crossings, Human errors, Equipment defects, Fatality rates

2. Introduction

One of the earliest forms of transportation in the world is railways which have played a very important role in encouraging trade. An efficient railway decreases transportation cost, joins people and market throughout an entire nation thereby, bridging the backward regions and economy of the nation.

Railways in India are known to be the most widely used means of transport. Indian Railways has sustained its development over the years. The railways have played a vital role in increasing the economy of the country. India is covered with railway tracks which are extended up to a route length of 67,368 kms with 12,108 locomotives and 2,89,185 freight wagons and 55,258 passenger coaches. Indian railways has carried 1.06 billion tones of the freight and travelled 1,149.835 billion passenger kms only in year 2017. The advantage of Railway transportation is that it is reliable and does not get affected by weather conditions. It is more suitable for carrying bulky and heavy loads over long journeys. They are known to be the only reliable source of transportation on land. Despite its feasibility, Indian Railways are more prone to accidents, which have brought a significant amount of attention upon it. The cause of accidents is one or more than one factors working together. The Railways have grown on parameters like infrastructure, expenditure and freight, however the statistics for accidents have increased

It has been concluded that the accidents are mostly because of Human errors and Equipment defects. Due to these Human errors and equipment errors, the rail accidents are happening. The main types of accidents discussed in this paper are, derailments, collisions, Fire accidents in train, accidents near Level crossing.

3.Railway accidents In India

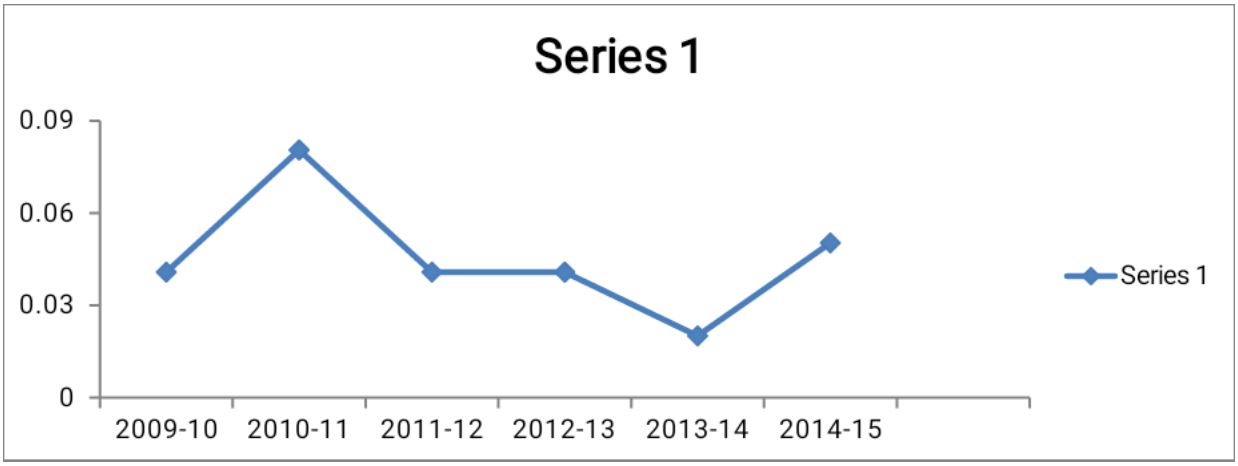
An average between 1990-1995, an average of more than 500 accidents took place every year over railways, with around 2,400 deaths and 4,300 injured in those five years, a decade later between 2013-2018, an average of around 110 accidents took place every year which killed around 990 people and injured about 1,500 people.

During 2018-2019, the number of accidents took at 59, with 37 deaths and 108 injured.

3.1 Train accidents per million kilometers run

The trains of the Indian Railways are clocking more passenger kilometers each year. From 2.08 lakh million kilometers in 1980-81, the number of passenger kilometers reached 11.47 lakh million kilometers in 2014-15. Train accidents per

Chart1:-.Casualities per Million Passengers Carried.



million kilometers run is an important parameter to understand the occurrence of accidents and if there has been any improvement over the years. This parameter has continuously decreased from 2009-10 to 2013-14. In again increased in 2014-15. From 0.17 in 2009-10, it has come to down to 0.10 in 2013-14, a reduction of over 40% in 5 years. But it again increased to 0.11 in 2014-15.

3.2 Casualties per million passengers carried

From 3613 million passengers in 1980-81, the number of originating passengers reached 8224 million in 2014-15. Except for 2010-11, this parameter was more or less constant at 0.04. In 2010-11, it rose to 0.08 owing to a high number of

casualties. While it decreased to 0.02 in 2013-14, it increased to 0.05 in 2014-15 because of a higher casualty figure.

Chart2:-.Number of Railway Accidents by type in India.

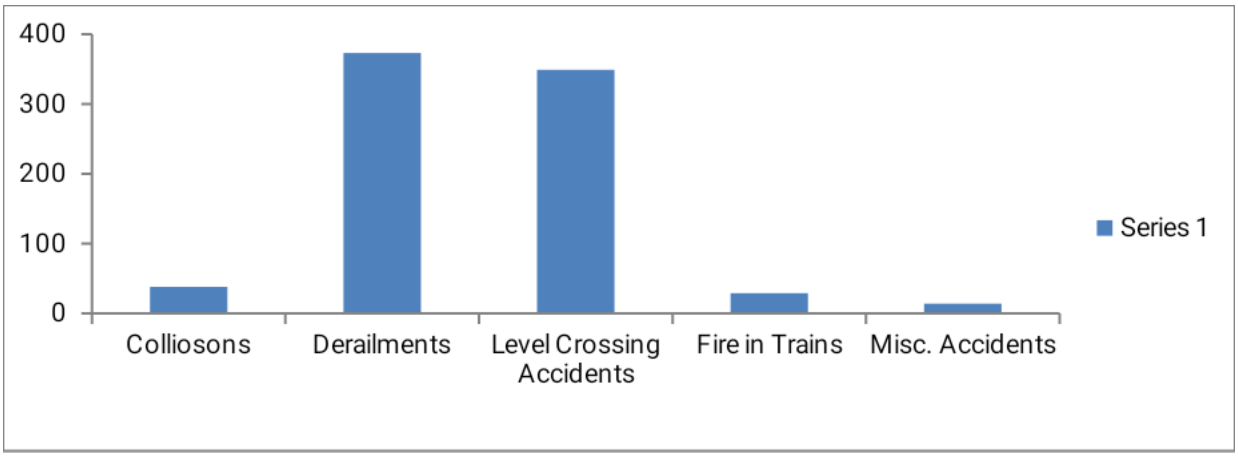
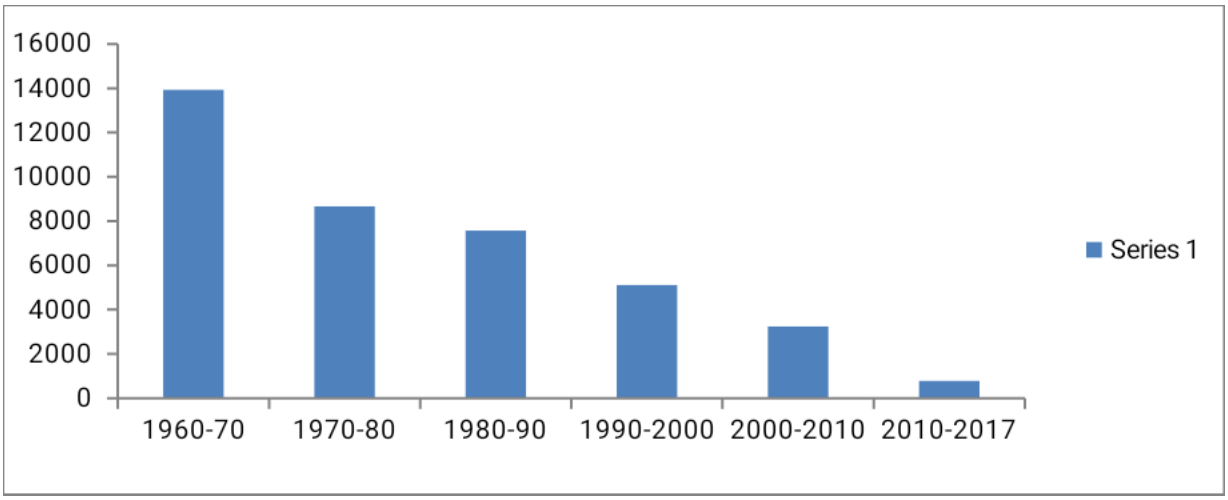


Table1:-.Indian Railway Train Accidents Since 1960

Year	Types Of Accidents				Total Number Of Accidents
	Derailment	Collisions	Fire In Train	Level Crossing Accidents	
1960-70	10644	834	1037	1394	3929
1970-80	6763	597	185	1120	8665
1980-90	6242	475	176	677	7570
1990-2000	3943	360	94	716	5113
2000-2010	1330	115	76	719	2240

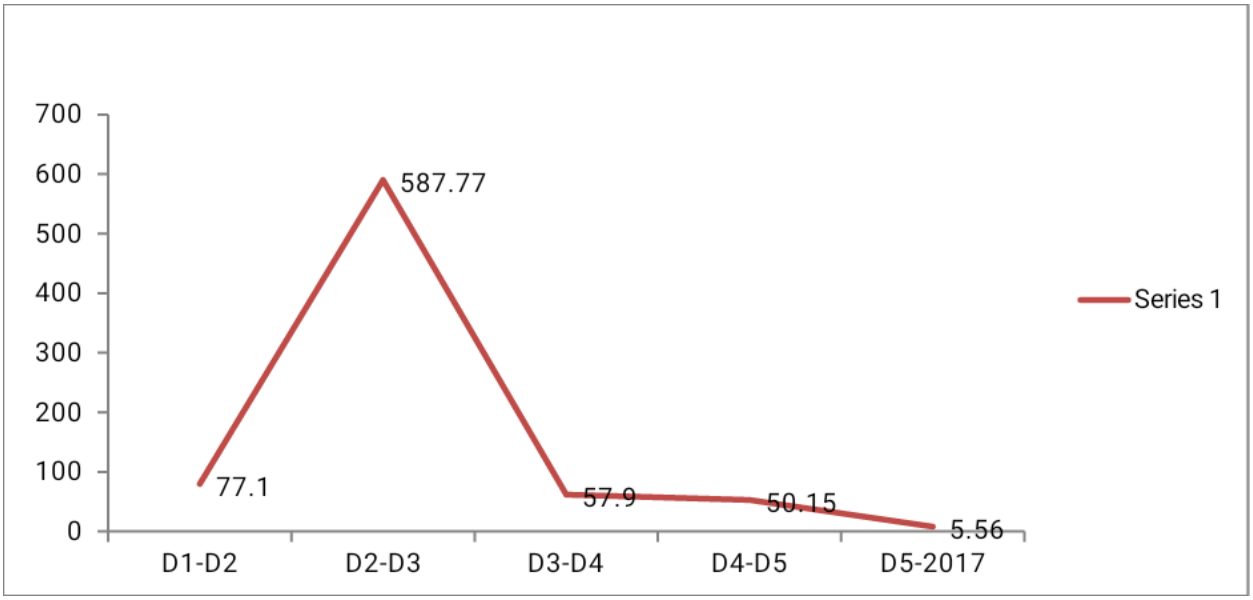
2010-2017	363	31	28	359	781

Chart3:-. Indian railway Train Accidents since 1960.



It has been observed that, there is a gradual decrease in total number of railway accidents for each decade. Number of accidents from the (decade 1) to (decade 2) were decreased by 37.79%, from the (decade 2 to decade 3) they were decreased by more 12.63%, from the (decade 3 to decade 4) they were decreased by more 32.45%, from the (decade 4 to decade 5) they were decreased by more 56.19% and number of accidents from the (decade 5 to 2017) were decreased by more 65.13 %.

Chart 4:-.Number of Lives lost in these Accidents



The percentage of number of accidents in the decade 1(D1) to decade 2 (D2) were decreased by 77.01% and they got increased by 587.77% from decade 2 to decade 3 (D3), and suddenly the death rate falls to 57.19% in decade 4 (D4). This shows some inconsistency in the death rate. Most of this accident are happening because of with human and equipment errors.

4. Rectifications

There are various kinds of the solutions that can be provided for decreasing the number of the accidents and thus improving the Great Indian Railways , instead the implemented and effectively carried.

4.1 To Avoid Derailment

a) Use of the emergency brakes and chain pulling during the high-speed movement of train must be avoided.

b) Track fracture can be avoided when over loading on the track is avoided, most of the Indian tracks are old, they can bear up to 15 ton/axle. The new tracks that are being constructed now by the Indian government can bear the load up to 24 ton/axle.

c) During the winter and summer seasons, the process of contraction and expansion is going to take place. Especially in the winter season if the temperature is less than 10 degrees centigrade then the track behaves hard and it many breaks in some cases. So, proper maintenance of tracks should be done.

d) Proper checking of connection with bolts between Fishplate and iron beam.

e) The usage of the old coaches called ICF Coaches should be restricted, instead of that the Indian railways should use LHB (Linke Holfmann Busch) coaches because the coaches do not climb over each and crash, it happens because of CBC (Centre buffer Coupler).

f) Rail joints space should be 2.5 to 3 cm, otherwise the train will derail.

g) Breaks Jam is one of the important for derailment, when the friction increases, the axle is going to break. To avoid this, the rusting of tracks must be avoided by proper lubrication should be done. Maintenance of the track must be done thoroughly.

h) Ultrasonic flaw detection devices should be installed for the detection of cracks and rail failures.

i) Long rail panels of 260 M/130M length are being manufactured at the steel plant to minimize number of Alumino Thermit joints in the track.

j) A GPS based Fog Pass device is being provided to loco pilots in fog affected areas which enables loco pilots to know the exact distance of the approaching landmarks like signals, level crossing gates etc.

4.2 Technologies that need to be implemented ASAP

a) Anti Collision Device (ACD) developed by Konkan Railway Corporation Limited (KRCL) has been provided as a pilot project on 1,736 route kilometres of Northeast Frontier Railway. This was a single/double line non electrified Broad Gauge section. Trials with modified ACD, with improved efficacy, reliability and availability, were carried out on electrified multiple-line and automatic signalling section of Southern Railway.

b) Vigilance Control Device (VCD) is a system where if the driver does not perform a certain set of actions over a period of time, sound alarms, flashing light and brake systems start operating automatically.

c) Auxiliary Warning System (AWS) : IR's experience of Train Protection Systems has been so far largely limited to the AWS provided on Suburban sections of Mumbai on Western and Central Railways in 1980s. This system is working satisfactorily.

d) Block Proving Axle Counters (BPAC) : In order to enhance safety by automatic verification of complete arrival of train, BPAC is being provided at stations having centralized operation of points and signals.

e) Train Protection and Warning System: Train Protection and Warning System (TPWS) based on European Technology ETCS Level-1, a proven Automatic Train Protection (ATP)

System to avoid train accident /collision on account of human error of Signal Passing at Danger (SPAD) or over speeding.

e) Ballast Less Track:-

a)The advantages of a ballastless track over a traditional superstructure are its highly consistent track geometry, its longer life span, and the reduced need for maintenance.

b) A ballastless track's track geometry is achieved mainly due its relative inelasticity in comparison to a traditional superstructure that results in far fewer deformations and generally smoother running.

c) Advantages of ballastless tracks include better and controlled drainage , the elimination of flying-ballast damage on rolling stock and civil engineering structures, a shallower superstructure, and the possibility run-over sections such as crossings over which pneumatic vehicles can be driven. When used in stations, ballastless tracks are easier to clean.

Refrences:-

{1}. Press Information Bureau Government of India Ministry of Railways
26 JUN 2019 5:38PM by PIB Delhi

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{2}. S. B. Aher and D. R. Tiwari Railway(2018) "Disasters in India: Causes, Effects and Management" .

{3}. Satish Bhagwatrao Aher , Deepak Raj Tiwari (2017) "Railway Disasters in India: Causes, Effects and Management".

{4}. G. H V Sai Simha ,Shubhangini Bisht(2019) "Accidents in Indian Railway System".

{5}.Indian Railway Annual report and account