

Analysis Report by High Level Safety Review Committee

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Abstract

Indian Railways is one of the largest railway systems in the world and is fully owned and operated by Ministry of Railways, Government of India. It plays a significant role in driving economic growth of the country, offering highly affordable, environment- friendly transportation to passengers and freight, specially bulk commodities, across the country. Indian Railways, like any other transportation system, is technology intensive not only for ensuring high productivity of its assets but also safety in train operations.

Though the data of consequential train accidents over the years has been showing declining trend despite phenomenal growth of traffic, safety on IR remains to be a matter of serious concern. Recent accident such as derailment of Kalinga Utkal Express near Khatauli in Muzaffarnagar district of Uttar Pradesh on 19 August 2017 resulting in death of 23 passengers and injuries to 156 passengers raise an alarm over the safety standards and practices adopted on Indian Railways. This accident being the fourth major passenger train derailment in 2017 and the third in Uttar Pradesh.

Taking note of the unsatisfactory safety record of IR, it is necessary to revisit and analyse the most important and latest report on safety, that is High Level Safety Review Committee Report commonly known as Kakodkar Report.

1 Committee members

The Committee Members are as under:

1. Dr. Anil Kakodkar, former Chairman, Atomic Energy Commission and Secretary, Department of Atomic Energy (Chairman)
2. Shri E. Sreedharan, Managing Director, Delhi Metro Rail Corporation (Adviser).
3. Dr. N. Vedachalam, Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram, (Member)
4. Prof. Sanjay Dhande, Director, IIT, Kanpur, (Member)

5. Shri G.P. Srivastava, Director E & I Group, Bhabha Atomic Research Centre (BARC), (Member)

6. Shri Amitabh, SAG/IRSME, Chief Rolling Stock Engineer, Northern Railway, (Secretary)

2 Earlier Committees

Ministry of Railways have earlier constituted the Khanna Committee 1998, the Sikri Committee 1978, Wanchoo Committee 1968 and Kunzru Committee 1962. The present Committee which comprises of scientists and technocrats is more strongly mandated to go into all technical and technology related aspects in connection with safe running of train services in the country.

3 Statistics of Consequential Train Accidents

Indian Railway is a vast system comprising of nearly 64000 route kilometres with over 7000 block stations and holding nearly 9000 locomotives, 43500 Passenger coaches,

The Committee analysed data of consequential train accidents on IR to have an insight into the weak areas leading to accidents. The Committee is also seized of the fact that the data maintained in Railway Board office pertains to only those train accidents with apparent consequences and train accidents of minor nature and near misses are not included in the figures. Further, the Committee learnt that casualties due to trespassing of railway track, or for other reasons connected with railway infrastructure and casualties of IRs own staff while on duty, though quite substantial, are not included in the statistics of train accident related casualties.

Casualties of Railways own staff while on duty were collected from Zonal Railways and the position is markedly high. About 1600 railway staff were killed and 8700 injured while working during the period from 2007-08 to October, 2011 which is substantially

more than 1019 deaths and 2118 injuries in train accidents for the period from 2007-08 to 2010-11. It is to be noted that casualties in train accidents include a large chunk of 723 deaths and 690 injuries due to unmanned level crossing accidents attributed to the negligence of road users. Departments that contributed maximum are engineering track with 1100 deaths and 2070 injuries and Mechanical with 110 deaths and 4900 injuries. Mechanisation of track and other maintenance is one solution to reduce human presence in high risk areas of railway working. On the whole, Casualties in train accidents and for other reasons due to railway infrastructure remain a serious cause of concern.

3.1 Consequential Train Accidents

Total Consequential train accidents have come down from 195 in 2006-07 to 141 in 2010-11 (Fig 1) and consequential train accidents per million train Kilo-metre have also come down from 0.23 to 0.15 during this 5 year period (Fig 2).

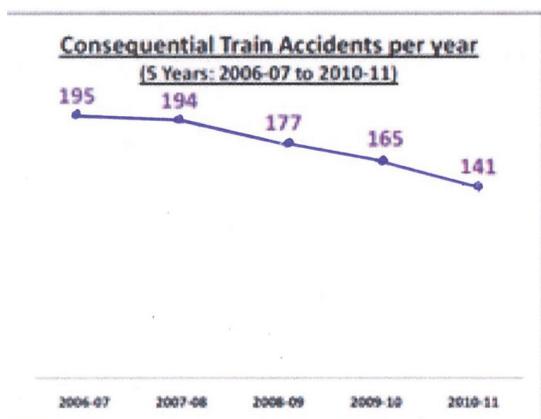


Figure 1: Total consequential train accidents

3.2 Type Wise Accidents

Derailments constitute largest chunk of 50% of total accidents followed by 36% accidents at unmanned level crossing gates, 5% collisions, 4% accidents at manned level crossing gates, 2% fire accidents and balance 3% accidents are due to misc. reasons (Fig 3).

Variation/decline in types of accident over this 5 year period can be seen in Fig 4.

3.3 Causalities

Deaths have gone up from 208 to 381 and total casualties from 610 to 844 during the same period due to

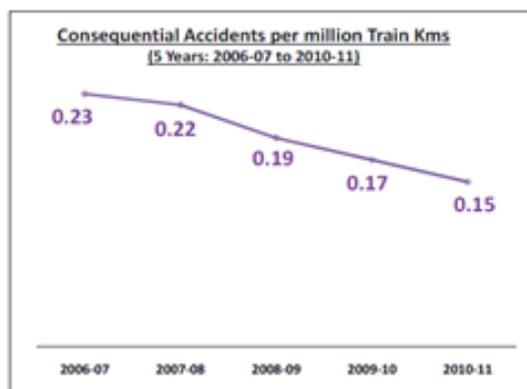


Figure 2: Consequential train accidents per million train km

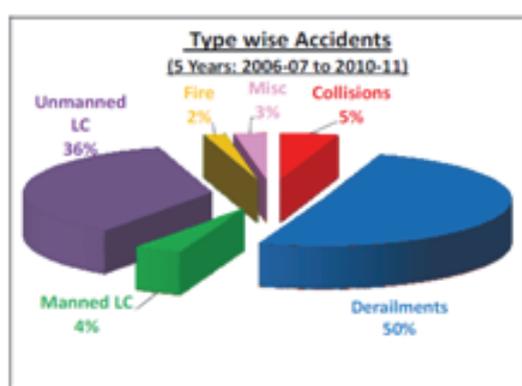


Figure 3: Typewise accidents - distribution

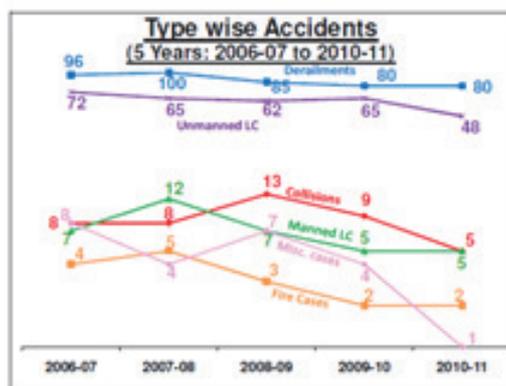


Figure 4: Typewise accidents - trend

severity of accidents (Fig 5).

Proportion of deaths, injuries and total casualties (deaths + injuries) due to different types of accidents

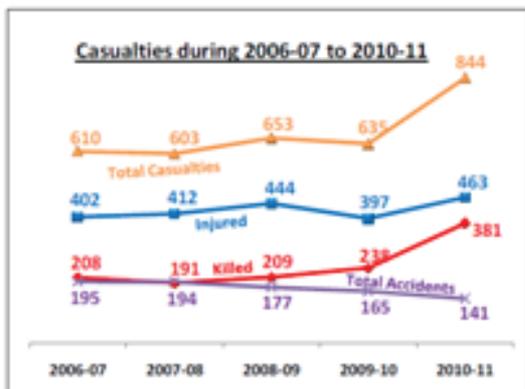


Figure 5: Casualties

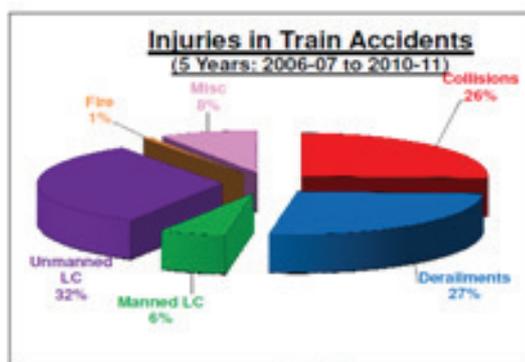


Figure 8: Deaths in Train Accidents

is shown from Fig 6, Fig 7 and Fig 8.

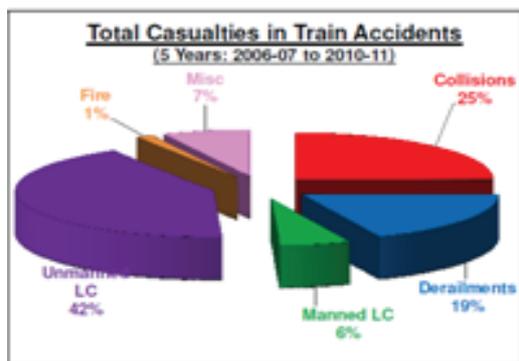


Figure 6: Casualties Proportions

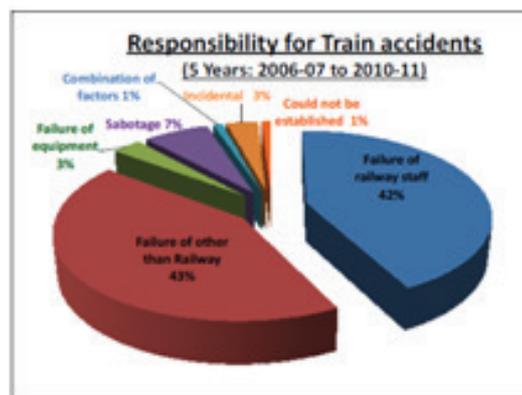


Figure 9: Responsibility of Train Accidents

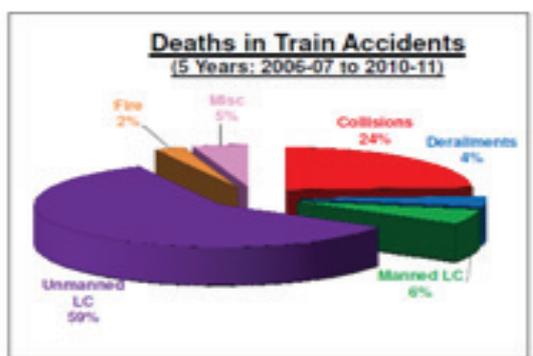


Figure 7: Deaths in Train Accidents

3.4 Responsibility of Train Accidents

Cause-wise analysis indicates that 42% of accidents took place due to failure of railway staff, 43% due to

failure of other than railway staff, 7% due to sabotage, 3% each due to failure of equipment and incidental and balance 1% each due to combination of factors and non-establishment of cause(Fig 9).

Thus a large chunk of 85% of accidents is on account of human failure. The Committee noted that there are prescribed rules to run trains during abnormal conditions with greater human intervention under failure conditions of the assets such as signal failure. The Committee also noted that train accidents due to sabotage have increased from 4.1% on 2006-07 to 11.36% in 2010-11(Fig 10).

3.5 Collisions

Collisions which are 5% of the total tally but resulted into 24% deaths and 26% injuries (25% total casualties). Numbers of collisions have varied from 13 during 2008-09 to 5 in 2010-11 whereas deaths and total casualties during the same years have been 9 & 62 during 2008-09 and 240 & 536 during 2010-11. This

Responsibility (%age) for Train accidents (5 Years: 2006-07 to 2010-11)					
	2006-07	2007-08	2008-09	2009-10	2010-11
Failure of railway staff	43.59	45.36	42.37	38.18	41.84
Failure of other than Railway	43.08	41.75	42.94	45.45	41.13
Failure of equipment	4.62	4.64	0	3.64	1.42
Sabotage	4.1	3.61	7.34	8.48	11.35
Combination of factors	0.51	0	2.26	0.61	1.42
Incidental	3.59	4.12	2.82	2.42	2.84
Could not be established	0.51	0.52	2.26	1.21	0

Figure 10: Responsibility% of train Accidents

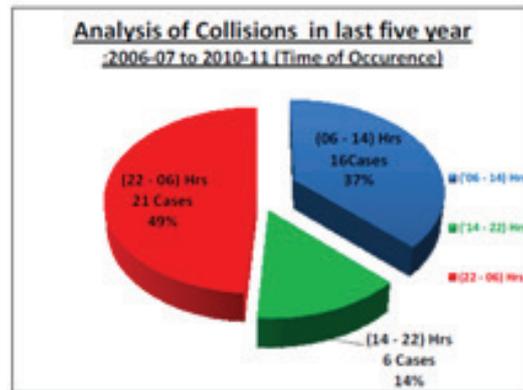


Figure 12: Collision Distribution

scenario of more deaths/casualties with fewer collisions during 2010-11 indicates the severity of collisions (Fig 11).

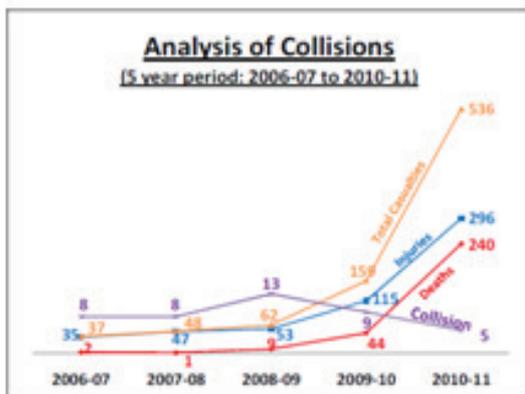


Figure 11: Analysis of collision

Analysis of collisions based on their time of occurrence indicates that period of 22:00 to 06:00 hrs is most vulnerable during which about 50% collisions occurred (Fig 12).

Further analysis indicates that out of a total of 43 collisions occurred during this period 21 where on account of driver passing signal at danger (SPAD), 10 on account of driver passing automatic signal in on position at higher speed and balance for other reasons.

3.6 Derailments

Derailments which are half of the consequential train accidents resulted in 4% deaths and 27% injuries (19% total casualties), have gradually come down over this period (Fig 13).

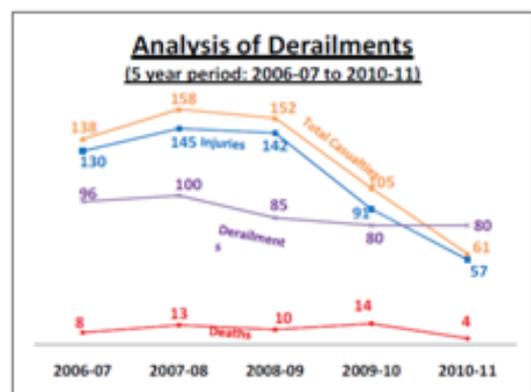


Figure 13: Analysis of Derailments

Analysis of derailments based on their time of occurrence indicates that there is no correlation though there is slightly higher possibility of derailments during 22:00 to 06:00 hrs (Fig 14).

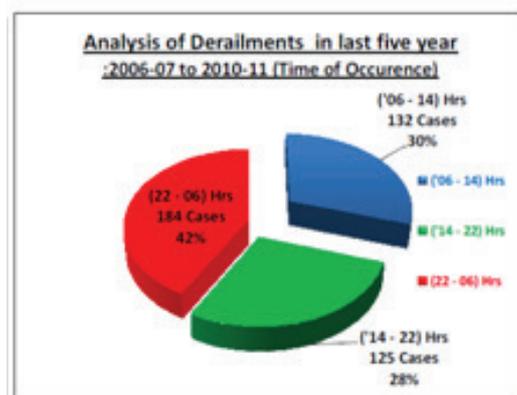


Figure 14: Derailment Distribution

Out of 441 derailments occurred during this period, maximum of 129 were contributed due to Civil Engineering defects, followed by 56 due to sabotage, 54 due to combination of staff, 43 due to carriage & wagon defects, 36 due to failure of other than railway staff, 27 due to failure of operating staff, 24 due to failure of equipment, 28 due to failure of Loco pilot, 26 incidental and balance for other reasons.

3.7 Unmanned LC Accidents

Unmanned Level Crossing accidents which are 36% of the total tally resulted in 59% deaths and 32% injuries (42% total casualties). Their numbers have also come down over this period (Fig 15).

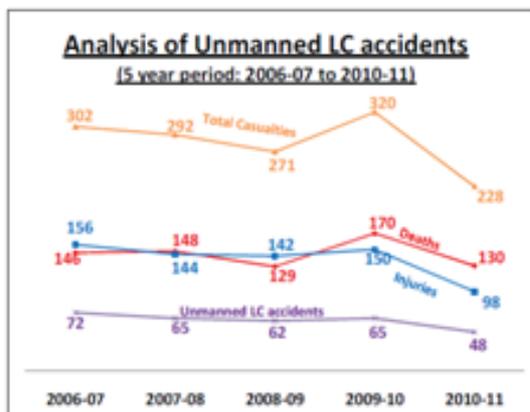


Figure 15: Unmanned Level Crossing Gate

Analysis of Unmanned Level Crossing based on their time of occurrence indicates that day light period of 08:00 to 19:00 hrs is most vulnerable during which about 86% accidents occurred (Fig 16).

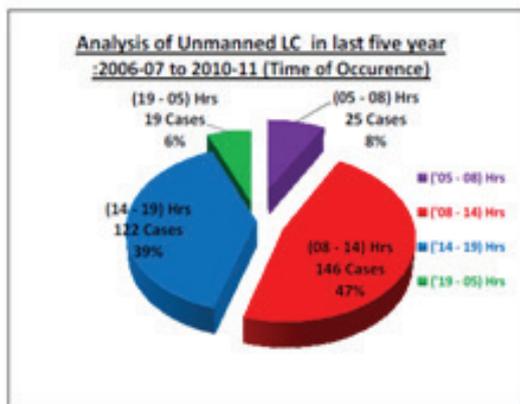


Figure 16: Unmanned Level Crossing Distribution

3.8 Manned LC Accidents

Manned Level Crossing accidents which are 4% of the total tally resulted in 6% deaths and 6% injuries (6% total casualties). Their numbers have also come down during this period (Fig 17).

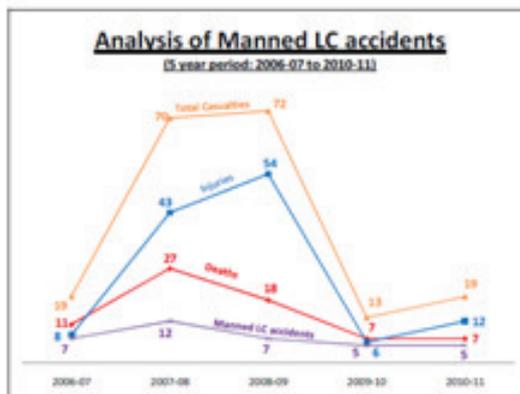


Figure 17: Manned Level Crossing Distribution

Analysis of Manned Level Crossing based on their time of occurrence indicates no correlation between them (Fig 18).

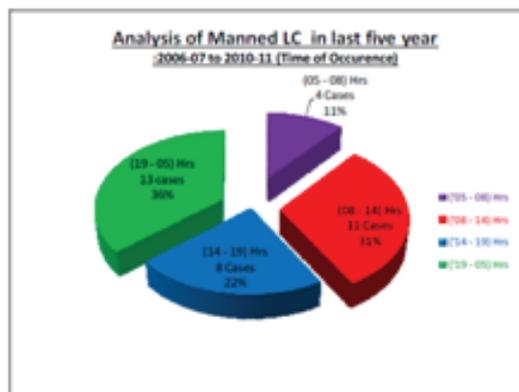


Figure 18: Manned Level Crossing Distribution

3.9 Fire Accidents

Fire accidents which are 2% of the total tally resulted in 2% deaths and 1%injuries (1% total casualties). Deaths and injuries have not reduced with reduction in fire accidents in 2008-09 (Fig 19).

Analysis of fire accidents based on their time of occurrence indicates that there is higher possibility of fire between 14:00 to 06:00 hrs. during which 88% accidents occurred (Fig 20).Eight cases were due to

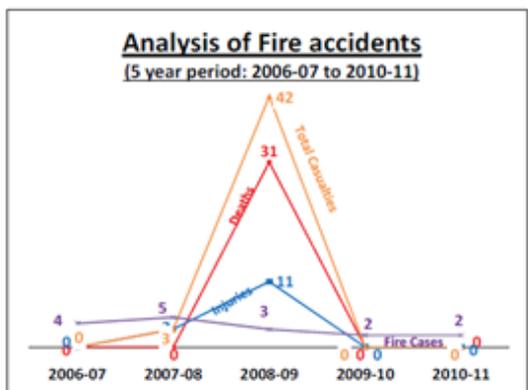


Figure 19: Analysis of Fire Accidents

Failure of other than Railway Staff (FORS) out of 16 cases of fire occurred during this period.

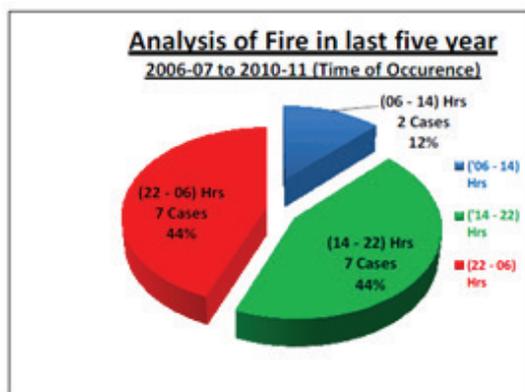


Figure 20: Fire Accidents Distribution

It is noted that many a time practices and incidents impinging on safety in train operation and also the cause of accidents are not fairly brought to the notice of management as departmental loyalties often overshadow the quest for getting into the ground realities for improvement. As has been the practice in some of the developed countries, the Committee recommends an IT system based on email / SMS should be put in place to report such matters which should be investigated by the safety officers at Headquarter and Divisional levels followed with appropriate corrective action.

4 Recommendations of the Committee

4.1 General Safety Matters

- IT system based on email / SMS should be introduced to report safety related matters by railway and non-railway persons. (Para 2.4.10).
- Redundancies should be built in the system such as track circuiting by two diverse means at vulnerable locations so that normal operations are least hampered due to single point failure.(Para 2.5)
- IT based system should be set up within 6 months to collect and collate all train accidents whether consequential or of little significance, near misses, safety related asset failures, etc. (Para 2.5)
- Projects for augmentation of line capacity on busy routes and maintenance facilities for coaches and wagons in open line and workshops should be funded and executed on top priority in mission mode. (Para 2.7)
- No new trains should be introduced without adequate capacity for operation and maintenance. (Para 2.7)

4.2 Organizational Structure

- Restructuring of IR should be examined and studied by a Separate Expert Group. (Para 2.8.2)
- Earlier system of only Operating and technical officers being considered for general posts of GMs and DRMs should be restored. Only capable officers should be selected as DRMs and posted in divisions with a minimum tenure of 3 years. (Para 2.8.3)

4.3 Empowerment at Working Level

Powers should be delegated to GMs and DRMs in regard to safety matters as under (Para 2.9.5):

- Powers of General Managers to be enhanced to 3 times for sanction of works under all Plan Heads except New Lines and M & P items. These should also be applicable under out-of-turn basis, depending on the urgency. Powers of DRMs also to be accordingly enhanced to 3 times.
- General Managers to be given full powers for re-appropriation of funds from one work to another under the same Plan Head and source of funds under all the Plan Heads, except New Lines.

- c) General Managers to have full powers to re-appropriate funds under Revenue under the same Demand from one PU to another within the overall budget allotment.
- d) DRMs to be fully empowered to decide the process/procedure such as Spot Purchase Committee, Single/Limited Tenders, etc.
- e) DRMs to have full powers to accept tenders floated by the division. To enter into repair or Annual Maintenance Contracts (AMC) through OEM or otherwise. To purchase stock items in case of shortages and non-stock items upto Rs. 3 Lakhs per case but without any monthly ceiling.
- f) DRMs to be empowered to award works of essential nature related to operation and maintenance assets on quotation basis for 3 months as a stop gap arrangement.
- g) DRMs to have full powers for hiring of resources including utility vehicles.
- h) DRMs to have full powers to sanction construction of RUBs, limited height subways and ROB under Road Safety works.
- i) Powers those vested with DRMs of the Division to be enjoyed by the Chief Workshop Managers (CWM) in respect of their workshops.
- j) Powers to sanction cash awards for good performance in safety related matters should be enhanced to three times. (Para 2.9.6)
- k) Enhanced delegation of powers to the divisions should be directly mandated by the Railway Board as a onetime measure. (Para 2.9.7)

4.4 Safety Related Works and Issues

Core Safety Groups should be formed under the convenor-ship of the Additional General Manager/Safety (a new post carved in Zonal headquarters part of the new safety architecture) at headquarter level and Sr. Divisional Safety Officer at divisional level. Principal Heads of Departments at HQ level and branch officers at divisional level of Civil, Mechanical, Electrical, Signalling, Operating and Finance should be the members. (Para 2.10.1)

Group of Officers headed by AGMs and ADRMs at the Headquarter and divisional levels respectively should convene meetings once every week to clear all the pending Engineering and Signalling Plans. (Para 2.10.2)

4.5 Shortage of Critical Safety Spares

Concerned directorates should issue a defined list of safety items to Zonal Railways for uniformity. (Para 2.13.1)

RDSO should take full responsibility of all those safety items for which drawing, specification, vendor approval, etc. are issued by RDSO. They should enter into long term rate contract with their approved vendors for 3 to 5 years after negotiating rates based on the value of the item which can be best assessed by RDSO. (Para 2.13.3)

A simple but effective vendor qualification and approval process should be followed for non-RDSO safety items at Zonal railway level. (Para 2.13.7)

A thorough review of the quality system for material procurement process by an external professional agency and revamping of the system should be done as necessary. (Para 2.13.8)

Conventional method of technical inspection should be replaced with modern Quality Management System for which necessary check sheets should be developed by the respective departments directly associated with safety. These check sheets should be based on present rules, regulations, manuals, instructions, etc. and should form part of the safety manual of the Railway. (Para 2.14)

4.6 Signalling, Telecommunication and Train Protection

State of the art signalling and protection system at least equivalent to the functionalities of ETCS L-2 should be deployed throughout IR, starting with the busy routes (19000 Kms) immediately. A sub-group of the Committee shall examine some of the critical aspects during visit to some of the European railway system and submit its report. (Para 3.5)

Diverse and redundant means of Satellite based train position sensing (as used in ACD) should be incorporated and merged in ATP functions. (Para 3.5)

A dedicated Special Purpose Vehicle (SPV) should be formed having full powers and the mandate to formulate and execute the sanctioned projects of ATP in a time bound manner (5 Years). (Para 3.6)

A high power standing technical review committee should be set up to guide the SPV on technical issues. This Committee should continue till the implementation of the project of ATP and should have experts from Railways as well as from outside. (Para 3.6)

Communication Based Train Control (CBTC) system should be used in Metros and dedicated corridor sections like Mumbai suburban, to meet the require-

ments of head way less than 1.5 minutes after study of design margins. (Para 3.6)

A “Task Force” should be set up to study the feasibility of communication backbone for IR, utilizing diverse and redundant technology to ensure highest level of availability of the networks for safety and operational requirements. (Para 3.6)

RDSO signalling directorate should be augmented with comprehensive research framework in order to include work on forecasting/newer signalling and telecom technologies. (Para 3.6)

4.7 Level Crossings

All Level Crossings whether manned (with or without signals) or unmanned should be eliminated in next 5 years. This is gigantic task for which dedicated SPVs should be formed in each of the Zonal railway fully empowered and mandated to complete the project in a time frame of 5 years. (Para 5.6)

Level Crossings having little road traffic should be closed. Merger of nearby LCs by constructing connecting roads at railways cost even on non-railway and should be taken up. (Para 5.6)

Construction of limited height sub-ways, Road under Bridge (RUB) and Road over Bridge (ROB) should be taken up in mission mode and traffic blocks should be generously granted. (Para 5.6)

No LC should be newly introduced under any circumstances on the existing system as well as during gauge conversion, doubling and construction of new railway lines. (5.6)

No LC gate should henceforth be manned or interlocked. (Para 5.6)

The present policy of sharing the cost of RUB or ROB with the State Governments should be dispensed with and the full responsibility and entire cost of construction should be taken over by the Railways. For this purpose, the present Railway policy needs to be changed and section 19 of Railway Act needs to be amended. Further, to augment the Road Safety Fund a large share of diesel cess should come to the Railways for which Government of India should be approached. (Para 5.6)

To expedite the construction of limited height sub-ways, RUBs and ROBs the CRSs role should be taken away and relevant plans and documents should be approved and signed at the level of the concerned PHOD instead of sending them to the CRS for sanction unless there is some change in the track/yard layout. (Para 5.6)

4.8 Human Resource Development

A large number of projects of importance to Railways should be regularly awarded to some select engineering academic institutions in which students can participate. Courses, minor stream and major specializations in the area of railway engineering should be introduced in the Indian engineering academic programs. (Para 6.1)

All officers should be periodically imparted training in safety engineering for building a safety culture. (Para 6.2)

One training institute at the divisional level should be nominated and upgraded for training to staff on safety environment in the Railways. This institute should have animation films; general equipment, tools and gadgets used on Indian Railways, etc. (Para 6.2)

Departmental staff should be encouraged and extended resources to upgrade their professional qualifications and skills to be fit for promotion to the higher level. (Para 6.3)

All the newly recruited Assistant Loco Pilots should be Diploma holders instead of present Matriculate/ ITI holders. All the Maintenance Technicians in all Technical Departments should at least be ITI holders and supervisors should be at-least Diploma holders, preferably, Engineering Graduates. (Para 6.3)

Cadre of electric and diesel running staff should be separated in the present operating environment having large number of loco variants of both types. (Para 6.4)

Such running staff who fails in any of the mandatory refresher course should be given only one extra chance to repeat the course and test should be taken at the concerned Branch Officer Level. In case the running staff fails again, he should be debarred from running duty and posted on other non-safety related assignments or given voluntary retirement following the prescribed rules and process. (Para 6.5)

Some portable cheaper version of loco simulators should be procured and located in drivers running rooms where running staff can brush up their driving skills at their convenience. (Para 6.7)

Customized signalling Panels should be introduced at the earliest in Zonal Railway Training Institutes (ZRTIs) for the training of station operating staff. (Para 6.8)

Separate hand-books should be prepared for the operating staff, such as loco pilots, station masters, etc. which should contain all the necessary instructions to be followed by them while performing their duty. (Para 6.9).

Each Division should have Grievance Redressal

Machinery which should deal with staff grievances in time-bound manner. (Para 6.10)

Special allowance equivalent to 25% of the salary and grade pay should be given to the staff who work as regular Gatemen as a special incentive during the intervening period till LC gates are closed.(Para 6.11)

4.9 Training Institutes on IR

All sanctioned capacity enhancement works of CTIs, ZRTIs and STSs should be fully funded and executed within next two years. (Para 6.2)

Posting as a trainer in Centralised Training Institutions (CTIs) should be based on the recommendation of a committee of which the Head of the institute concerned must be a member. Tenure of deserving officers may be extended on the recommendation of the Head of the CTI even if it involves transfer of elements of posts if such a trainer is due promotion so that he/ she can be promoted in the training institute itself. (Para 6.2)

Heads of CTIs should be given full powers to invite academicians, industry leaders, technocrats, etc. as visiting faculty within the allocated budget grant. In case of Railway Staff College, where Management training is imparted to officers of all railway disciplines, arrangements should be made to have one or two professional academicians on loan from management institutes of repute for a few years fixed tenure. (Para 6.2)

Funds for CTIs, Zonal Railway Training Institutes (ZRTIs) and Supervisors Training Schools (STSs) should be allocated separately both under Works as well as Revenue. Incurrence of expenditure under these fund-allocations should be fully under the control of Heads of the institute. Considering the importance and size of CTIs, they should have their own maintenance infrastructure. (Para 6.2)

Terms of Principals of ZRTIs and STSs should be fixed for at least 3years.(Para 6.2)

Teaching allowance of trainers of ZRTIs and STSs should be increased from 15% to 30% to bring it at par with trainers in CTIs. (Para 6.2)

5 Analysis of the Report

The Committee has given several recommendations in the report. Some of the recommendations have financial implications while many of the recommendations do not require funds for their implementation.

The recommendations which do not require funds may be implemented.

The requirement of funds to implement such funds specific recommendations indicating funds required

against individual items is shown in the table of Fig 22.

With present tight financial condition of IR it is not possible to implement recommendations with funds available. Methodology proposed for raising of funds for this purpose is shown in the table of Fig 21.

S. No.	Mode of funding	Annual Amount in Crores of Rs.
1	Safety Cess on Passengers	5000
2	Matching grant from Central Govt.	5000
3	Deferred dividend (against Social burden)	5000
4	Road Cess	1000
5	RLDA earnings	4000
	Total	20,000

Figure 21: Modes of Funding

A non-fungible non-lapsable safety fund generated with safety cess shall be required. It is possible to find the required resources for the critically needed safety expenditure through an innovative non-fungible and non-lapsable Dedicated Safety Fund for which the annual inflow comes from the captive passenger traffic.

However, increase of fare is a political decision, which may not be agreed seeing forthcoming elections.

Deferment of dividend to the tune of Rs. 5,000 Crores per year is proposed. This is justified as social service obligation being borne by Indian Railways is about Rs. 15,000 crores every year due to low ordinary class fare, sub-urban and non-sub-urban season fare, a variety of concessions granted on passenger tickets, transportation of certain commodities below cost and working of un-economic branch lines.

With Railway raising about Rs. 5,000 Crores per annum through safety cess, a matching grant from Central Government for safety related works is fully justified and demanded.

Three most important recommendations are-

1. Advanced Signalling system to prevent collision with increased line capacity.
2. Elimination of all level crossings (manned and unmanned) by grade separation (RUB/Limited High Subway/ROB.)
3. Switching over to production of all new coaches to LHB design.

Other recommendations may be implemented in the order as given in Table in Fig 22 depending on availability of funds.

Indian Railways severely suffers from implementation bug. This has caused non-implementation of

Proposed Investment on Safety over 5 years as per HIGH LEVEL SAFETY REVIEW COMMITTEE		
Figures in Crores of Rs.		
S. No.	Items	Total Estimated Cost
1	Advanced Signaling system to prevent collision with increased line capacity.	20000
2	Elimination of all level crossings (manned and unmanned) by Grade separation (RUB/Limited High Subway/ROB.)	50000
3	Switching over to production of all new coaches to LHB design. Following is the break up:	10000
	(a) Cost differential of LHB and ICF coaches (@ Rs. 1 Cr.)	7500
	(b) Additional Capacity in production units.	1500
	(c) Maintenance infrastructure in workshops and coaching depots.	1000
4	No discharge toilets in coaches (bio toilets / vacuum toilets).	3000
5	Weigh bridges.	10
6	Improvement in infrastructure in workshops and open line depots.	5000
7	Track friendly bogies for wagons.	2000
8	Identification tag on all types of rolling stock, communication backbone on the entire system, IT enabled applications such as Wheel Impact Load Detectors (WILD), hot box detectors, On-sight High Speed Camera at examination points, Acoustic bearing and bogie monitoring system.	1000
9	Self propelled USFD and track measurement machines.	1000
10	Track Maintenance Machines including rail grinding M/C	5000
11	Mobile Flash Butt welding Plants (@15 Cr. Per Machine). 1 each for the divisions.	1000
12	Formation improvement works	2000
13	Capacity enhancement in training CTIs, ZRTIs, STSs. Divisional Training Schools.	500
14	Proliferation of portable simulators for loco pilots and ASMs.	100
15	Railway Research & Development Council, Advanced Research Centres., RDSO upgradation, etc.	2500
16	Capacity Enhancement works to decongest existing network to facilitate corridor maintenance blocks	Included in Modernisation Report
TOTAL		103110

Figure 22: Requirement of Funds

some of the important accepted recommendations given by the past Safety Review Committees.

It is unfortunate if recommendations of this Committee as accepted by the Ministry of Railways also meet with the same fate.

The Committee recommends an empowered group of officers (including an officer from finance) in Rail-

way Board to pilot the implementation of safety enhancement recommendations and projects as accepted by the Ministry of Railways in a time bound manner with full funding. Other projects shall be appropriately pending or slowed down for the time being to accommodate funding of these key projects.

The Committee also recommends that newly con-

stituted Railway Safety Authority under the Govt. of India. Instead of this the existing Safety organisation of railways may be strengthened.

In the present set-up, Central Board for Railway Research (CBRR) contains 13 non-Railway members from different academia and industries and 11 Railway Members. This body is chaired by DG/RDSO and focuses on issues that are relevant, urgent and are on priority of IR. RRDC if created would be duplicating this work.

DG/RDSO should be made Adviser to MOR on R&D matters. Thus, strengthening/reorganising CBRR by taking members from proposed RRCs and giving status of Advisor to MOR to DG/RDSO would meet the objective more effectively. Hence establishing RRDC does not appear to be helpful in this regard.

It has been recommended by the Safety Committee that RDSO should take “ful” responsibility of all those safety items, for which drawing, specification, vendor approval etc. are issued by RDSO. The statement gives an impression that in case of any failure of such an item, in the field, RDSO shall be held responsible. RDSO should be responsible only in cases where there is a deficiency in the drawing or specification or the vendor approval carried out by it. In all fairness, RDSO should not be held responsible for items failing due to other reasons like failure due to poor maintenance or isolated manufacturing defects.

It has been further recommended by the Safety Committee that RDSO should enter into a long-term Rate Contract with their approved vendors after negotiating the rate based on the value of the item as assessed by RDSO. At present, there are 385 safety items, for which vendor approval is done by RDSO. Finalizing rate contract tenders for all these items will fritter away RDSO's energy and resources in stores procurement, which is not connected with the basic function of R&D, for which RDSO has been created. Moreover, RDSO currently does not have the resources for entering into Rate Contracts for purchasing such a large number of items or carrying out detailed costing of items and hence, is ill-equipped for handling this work. Also, if RDSO were the sole authority to draw specifications, approve vendors, inspect materials and also finalise rate contracts/procurement, it would give rise to more complaints from the point of view of inherent conflict of interest.

The recommendation seems to have stemmed from the fact that Zonal Railways & PUs are unable to arrange adequate supply of RDSO approved safety items at reasonable rates which is due to the perceived problem that Production Units/Zonal Rail-

ways are not able to many a times discipline the RDSO-approved vendors. Tender committees of the field units always have the option of passing over the offer of those vendors, who exhibit indiscipline in supply or rates or make substandard supplies, which they can always report to RDSO. Moreover, if they send substantiated complaints to RDSO, penal action can be initiated by RDSO against the erring vendors.

However, if it is felt that only a Central Organization should procure such safety items, a separate Central Purchase Organization may be created, to which RDSO should provide the necessary technical support. RDSO is not capable of handling procurement.

Recommendation regarding augmentation of signal directorate of RDSO is welcome. The present set-up of Signalling and Telecom Directorates has limited resources and mainly deals with development of specifications for current and foreseeable future railway requirements, development of vendors either through indigenous development or through cross approval etc. Most of the advances signalling systems are now software based and software as well as hardware needs to be evaluated for meeting the SIL-4 (Safety Integrity Level-4) requirements. Also signalling systems are now more and more communication based. Presently very little knowledge is available on design of software embedded system in RDSO. It is, therefore, necessary to have expertise in the following areas:

1. Development of software for safety systems.
2. Development of software embedded hardware for signalling systems.
3. Train control systems involving communication.

For this, a separate cell for each of the above areas may be created. Initially few consultants who have expertise in above areas are hired for a period of at least three years who will be fully associated with the team at RDSO and start development of work in the areas suggested by safety committee. It is expected that in three years, sufficient expertise will be developed in-house for taking up these tasks independently. Subsequently, it is also proposed to develop advance signalling laboratory with hardware and software simulators which will help in developing and evaluating designs of modern and advance signalling systems. The core purpose and objective of RDSO is to conduct high-end research to meet out the technical requirements in various railway specific areas. Therefore, high end facilities of ARRI can be located at RDSO itself. Creating a separate Advanced Railway Research Institute would only be a

duplicating effort as of setting up a parallel institute with the same objective. The logical need is to rationally address the constraint and challenges which today RDSO is facing in meeting out its core objective of advanced research. Instead of a parallel institute for the same task it would be appropriate if the relevant issues pertaining to autonomy, logistics, personnel selection/recruitment and enhanced powers are tackled at apex level.

The recommendation of Railway Research Centres is acceptable, as it would be a good collaboration between academia and railways. It would also help in upgrading expertise of institutions in Railways related area also as the institutes would be able to plan and develop their facilities for Railway Research with long term objective. In turn IR will get benefit of their expertise in carrying out research & development activities in relevant fields. At present, CRR (Centre for Railway Research) at IIT, Kharagpur is functional but it is multidisciplinary, not meant to deal with specific area of discipline only, as recommended by the Committee.

6 Conclusion

- With Implementation recommended by the safety of train operation is likely to be improved to a next level.
- However there is a need to generate funds. Based on the availability of funds recommendations may be implemented priority wise.
- There must be political and bureaucratic will for implementation in time bound manner.
- Instead of creating newly constituted Railway Safety Authority, the existing Safety organization of railways may be strengthened.
- Instead of opening new research unit, RDSO may be strengthened.

7 References/Bibliography

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The information / views expressed in this paper is of the authors and are based on their experience. Comments / observations may be sent to the author at mukesh_mehrotra@yahoo.com

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