

**Government of India
Ministry of Railways
(Railway Board)**

No.2020/Safety(DM)/7/25

New Delhi, dtd. 07.12.2020


**General Managers,
All Zonal Railways and
CMD/KRCL**

Sub: SPAD Analysis.

In depth analysis of SPAD cases has been carried out by Safety Directorate and Psycho-Technical Dte of RDSO for the last five years (2015-16 to 2019-20).

SPAD analysis over the years is not showing any specific reasons or trend. Most of the cases are happening due to momentary loss of concentration, lack of alertness, negligence, assumption of the signal aspect and over confidence.

The analysis by Safety Directorate as well as by RDSO along with measures to reduce the possibility of cases of SPAD are attached as Annexure-I. Zonal Railways are requested for implementation of measures suggested in order to reduce the possibility of cases of SPAD. Action taken by Zonal Railway to reduce SPAD cases may be advised to Board.


(K.P. Yadav)
ED/Safety-II
Railway Board

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SPAD analysis by Safety Directorate

The analysis of the period April 2016 to March 2020 indicates the following:

- Average number of SPAD cases per year was 66 for the period Apr'2012 to Mar'2016. This has come down to 60 per year in the last four years (Apr'2016 to Mar'2020).
- SPAD as a cause resulting into consequential/other train accident shows a reducing trend (9 cases in 2016-17 and 3 cases in 2019-20)
- Cases of SPAD with Diesel traction are in reducing trend whereas cases with Electrical traction increasing which correlates with increasing use of electric traction.
- No. of SPAD cases in **suburban system have substantially increased** from 1 in 2017-18 to 16 in 2018-19 and 13 in 2019-20.
- Top 5 Railways with maximum no. of SPAD in the last 5 years are: SCR-34, CR-29, WR-28, NCR-21 and NR-20.
- A considerably high percent of SPAD cases have occurred immediately after the crew has availed **headquarters rest**, being to the tune of **60.5%**.
- Maximum SPAD have occurred during the time of 0600 to 0800 hours in the morning and 1800 to 2000 hours in the evening.
- 75.7% of SPAD cases have occurred within 6 hours from 'Sign ON'. This indicated probably lack of concentration or alertness during the initial period of duty. This if analysed in conjunction with the fact that 60% of cases occurred with crew after availing headquarter rest, suggests that the drivers were possibly preoccupied with some domestic matters that caused lapse of concentration or alertness.
- 47% of SPAD cases have happened at Starter Signal and 39% have happened at Home Signal.
- Number of SPAD cases per thousand crew indicates that departmental staff is involved in SPAD 1.2 times compared to staff recruited through RRB.
- Age wise analysis indicates that 63% SPAD cases are by Crew in the age group 45 and above.
- Maximum number of SPAD took place in the month of May which may be due to extreme hot conditions causing physical discomfort or fatigue resulting in lapse of concentration.
- **The enquiry findings of the SPAD** cases indicate that 75% of the SPADs are due to lack of alertness and negligence of the Crew while 20% of cases were due to delayed brake application.

The analysis of the period April 2020 to September 2020 indicates the following:

- In the current year upto 11.10.2020 there are 17 SPAD cases as compared to 37 cases in the corresponding period of last year. The cases of SPAD in the current year are not truly comparable with corresponding period of last year as the total number of trains running in the current year is much lower.
- In the current year, 03 cases of SPAD have taken place by engineering trains i.e. Track Machines as compared to NIL cases on this account in 2019-20.
- In the current year there are 8 cases of SPAD of light engine out of 13 SPAD cases of Goods train which is abnormally high.

SPAD analysis by RDSO

The report of RDSO has analyzed the reasons for SPAD, listed out the potential causes of SPAD and discussed the studies carried out in the past. The report of RDSO is placed at S No.

RDSO report indicates that Cognitive and individual factors like driver's alertness/attentiveness/ vigilance, fatigue, perception, situational awareness, stress, personal issues; Organisational factors like culture, training, procedures, resources, teamwork and Job-specific factors like signalling, train controls and instruments, communications etc. are generally the potential causes of SPAD.

Further RDSO has presented the analysis in two different ways, namely, one based on the data of Railway Board and the other based on the information received directly from the zonal railways.

The analysis based on the data of Railway Board has indicated the same findings as brought out in Safety Directorate's analysis.

The analysis based on the data from Railways has brought out some additional findings which are as under:

1. Higher educational background (above Metric) has resulted in lesser number of SPAD cases (only 29.5%)
2. Loco Pilots having graduate degree were involved in only 1.9% of all SPAD cases
3. Loco Pilots belonging to the age range of 40-60 years have committed most of SPAD incidences with more number of cases in 55-60 years range thereby suggesting the there is a decline in cognitive as well as psycho-motor functions with increase in age
4. The distance travelled after SPAD by Loco Pilots in maximum cases has been within 200 meters but in few cases, travelled distance was even more than one Kilometre pointing to acute cases of not being attentive and need thorough investigation in the underlying issue.
5. A deeper probe with respect to personality profiling of some of the SPAD involved Loco Pilots suggested that they were under considerable stress which is a pertinent factor in decrement of alertness.
6. Loco Pilots residing in their own houses have been found to commit more SPAD cases as compared to those who reside at Railway quarters. This may be attributed to increased responsibilities and therefore increased stress levels.

Based on the analysis of Board and analysis of data from railways, RDSO has suggested that:

1. Loco Pilots need to be given training in terms of advanced training tools as well as Psycho-intervention in safety related aspects and backing it with counselling to address any personal issues or issues related to Cognitive and Personality attributes.
2. Need for more stringent training and watchful eye about working of departmentally selected candidates.
3. Remedial measures for redressal of alertness issue: The Loco Pilots suffer from stress both at personal as well as organizational level. The most common stresses are the work load, inadequate rest and other management related issues pertaining to recognition of their work and reward apart from their personal problems, which they find unable to tackle owing to poor work-life balance and not getting leave from work, leading to disgruntlement. The report suggests some ways which if adopted by Loco Pilots can lead to their overall well-being and enhancement of cognitive capabilities including alertness level.

The analysis both by Safety Directorate and RDSO could not establish the exact reasons for SPAD cases. SPAD analysis over the years is not showing any specific reasons or trend. Most of the cases are happening due to momentary loss of concentration, lack of alertness, negligence, assumption of the signal aspect and over confidence.

However, based on facts which have emerged from the analysis, the following measures are suggested for implementation to reduce the possibility of cases of SPAD:

1. The stress level on the Loco pilots needs to be reduced. This will improve the alertness.
2. Various possible measures may be taken to improve the alertness of the Loco pilots some of which are given in RDSO's report.
3. Proper counselling and Psycho-intervention is required at regular intervals.
4. Training plays an important role especially simulator training to improve the driving skills of the Loco pilots. The possibility of increasing the frequency of training of the drivers on the simulator and making it mandatory every 6 months for atleast 2-3 hours is likely to improve the situation.
5. Over 60 % of SPAD cases are happening subsequent to Head quarter rest. Awareness and need for proper rest at HQs has to be emphasized to Running staff family members through interaction at divisional officers level. Further, the possibility of having a small chat or informal session with drivers before being booked after HQ rest for duty may be considered.
6. It has been observed that Assistant Loco pilots hesitate to use D1 emergency valve in case they feel that Loco pilot is not under control of the train. To familiarize and improve confidence of Assistant Loco pilots they should be trained in simulator or in yards in operation of D1 emergency valve. They need to be counselled to use the measure as and when required to avoid cases of SPAD.
7. The departmentally promoted Loco pilots need more monitoring and training.
8. The possibility of inducting Loco pilots with higher education levels may be examined and implemented if feasible.
9. Special drive may be launched in railways having sub-urban sections to counsel the Loco pilots /motorman so as to arrest the increasing trend of SPAD in suburban sections. Only Psycho test cleared running staff shall be deployed in DEMU/MEMU/EMU services.
10. SCR, CR, WR, NCR and NR may carry out in depth analysis of each SPAD case so as to take proactive steps and step up vigil for arresting the cases of SPAD over their railways.
11. Since a large number of the cases have occurred at the starter signals, the location of signals on the wrong side and increasing the awareness of Loco pilots for the procedure to be followed before starting the train to make sure that they are following the correct signal meant for their train may be considered.
12. The number of SPAD cases by engineering trains i.e. track machines has increased in the current year. It is suggested that the operators of such machines be given more rigorous training on operational, road learning and such issues so as to reduce these cases. Also, the possibility of deploying LP/ALP to clear the machines from the sections may be considered.
13. Strategies like monitoring of working hours, filling up the vacancies, fair and quick grievance redressal system, prompt promotions, good living conditions in Railway colony, yoga and meditation, guiding running staff towards healthy food habits, psychological counselling, appreciating the good work done by running staff, crew friendly lobbies etc, can have far reaching effect in improving the satisfaction levels in running staff thus improving alertness/safety.
