Lessons Learnt during Accident Investigations – Case of a Side Collision

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SUMMARY

A side collision occurred between a passenger train (18006) and a freight train at Jharsuguda station of Indian Railways on 23rd Nov. 2011. 18006 was waiting at Platform for its scheduled departure. Starter Signal was given for freight train standing on adjacent line. The driver of 18006, mistaking this Starter Signal as his own signal, started his train. At the same time, the freight train for which starter signal had been cleared, also started. Leading locomotive of the freight train side collided with the middle coaches of the passenger train at the point of convergence of two lines. 3 passengers sustained minor injuries. Several important lessons could be learnt from the Investigation of this accident which are enumerated in the paper hereinafter.

INTRODUCTION - THE ACCIDENT

Train No.18006 arrived at Jharsuguda station line no.4 (Platform 3), much ahead of its scheduled arrival time, almost an hour earlier. Jharsuguda was the crew changing point for this train. New crew took over the charge of the train. They had availed nearly 8 hours rest before taking charge of the train. The train was waiting at the platform and ready for departure at its scheduled departure time of 01.50 hrs. A freight train was standing on adjacent line (Line no.5) and was also ready for departure. When the signal was cleared for the freight train standing on adjacent line at 01.57 hrs, the crew of passenger train were expecting their signal to be cleared. This caused the confusion in their mind that ***their*** signal has been cleared instead of the signal of the freight train. The driver of 18006, mistaking this Starter Signal as his own signal, started his train.

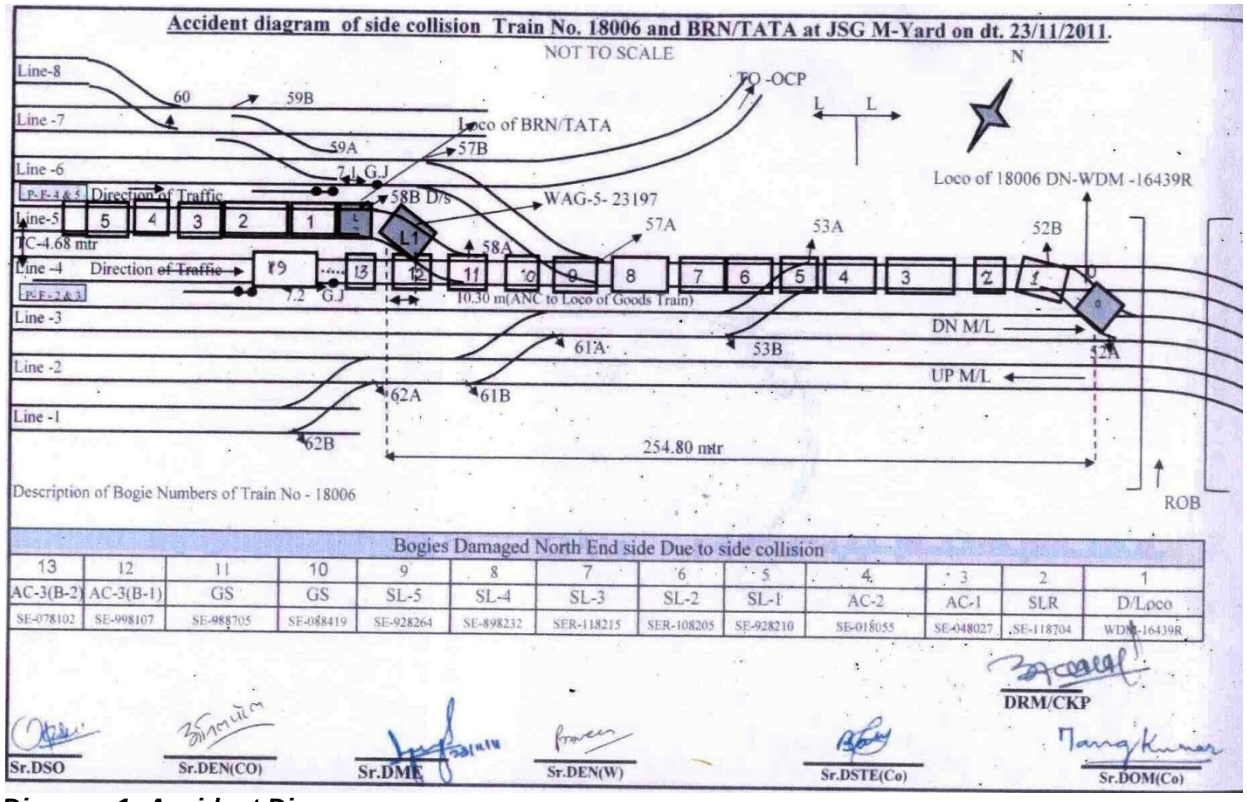

Diagram 1: Accident Diagram

Thus the train No.18006 started on observing the wrong signal and passed its ***own*** Starter Signal (S-20) at Danger; trailed through point (switch) No.58-A and continued running. At the same time, the freight train for which starter signal (S-22) had been cleared, also started from adjacent line. On seeing that train No.18006 was moving ahead on the same route, the Loco Pilot of freight train applied emergency brakes and stopped his train. The train stopped within a short distance but side collision between leading locomotive of freight train and 10 coaches of passenger train took place at the point of convergence of two lines. When 18006 subsequently stopped, 10 coaches (3rd to 12th) were damaged from outside. In the accident, 3 persons suffered injuries. 2 passengers needed medical aid at site and 1 was sent to Government hospital for further treatment.

THE INQUIRY AND LESSONS LEARNT

Several important lessons could be learnt from the Investigation of the Accident:

1. Starter Signal S-20 of line No.4 where 18006 was standing is located on the Right Hand Side of the track instead of the normal positioning on the left side of the track. Loco Pilot (LP) sits on the right side and Asstt. Loco Pilot (ALP) sits on the Left side. The Loco of this train was working long hood. In this type of operation of a loco with long hood driving, this signal was visible to the LP but not to the ALP. Moreover, S-20 was not visible from all locations of the platform No.3 where the locomotive normally halts. The Starter Signal S-22 of line No.5 where the freight train was standing is located on Left Hand Side of line No.5. This signal was visible to ALP of 18006 but not to LP. It remains a fact that both the starter signals S-20 & S-22 were not visible simultaneously to LP and ALP due to long hood working of diesel locomotive.

   LESSON LEARNT: Long hood working of locomotive leading to restricted signal visibility should be avoided as far as possible and practical..

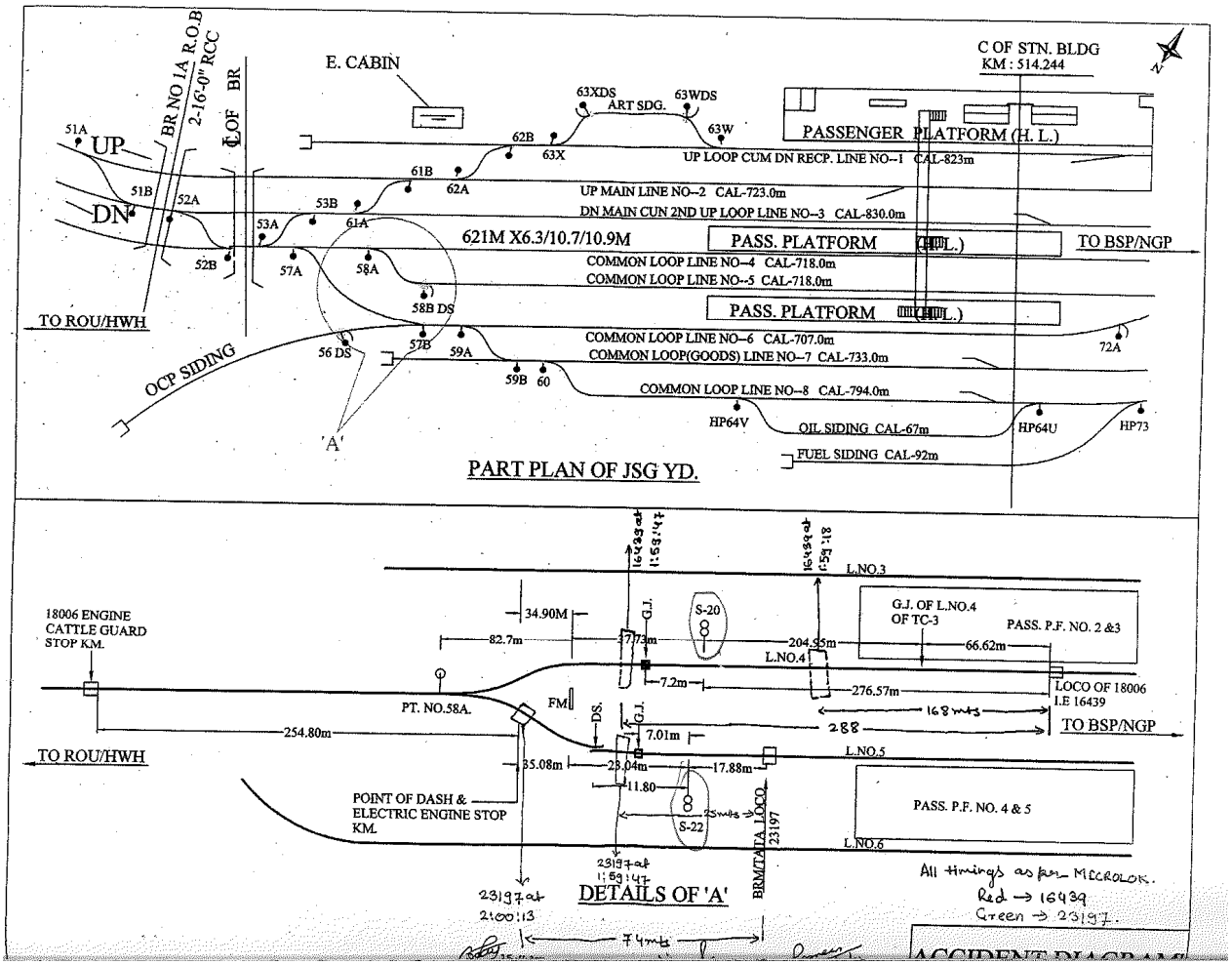

Diagram 2: Yard Layout

2. The signal S-20 was erected on the right hand side due to inadequate track centre distance. This was done during yard remodelling work, a couple of years back. However, approval of the competent authority was not taken for this deviation. Approval of a relatively junior officer was taken.

   LESSON LEARNT: Signals must be located on proper side of the track and if there is a deviation to this Rule, the approval of the 'Authorised Officer' should be taken.

3. When signal S-22 was lowered for the freight train, the crew of 18006 misjudged it as their own Starter and started the train.

   LESSON LEARNT: During 'road learning' of crew, special emphasis must be given for acclimatization with signals located on the 'Right Hand Side'. Section-wise list of signals located on RHS must be handed over to all crew for ready and regular reference.

4. Since both lines are in curvature towards right, geographical situation also leads to the confusion in misreading the signal of line No.5 as that of line No.4.

   LESSON LEARNT: Line curvatures must be taken care of while locating signals.

5. Subsequent testing of the signals revealed that the interlocking between the two signals was OK i.e. the conflicting signals S-20 & S-22 could not be taken off simultaneously. Further, the points (switches) were properly locked when the signal was lowered. Subsequent investigations also revealed that the aspect of signal S-20 was at 'Red' throughout the event. Therefore, it was established that the crew of 18006 passed the starter signal S-20 at danger.

   LESSON LEARNT: The 'arrow marker' on the signals provided to indicate the concerned line, must be made fluorescent type to ensure its visibility during night.

6. The freight train was the front portion of a long haul train (2 freight trains combined into one long train) which had to be split at Jharsuguda. The train stopped on line 5, with rear portion of the train blocking considerable length of the block section in rear. There was no other option than to detain 18006 and split the long haul train and dispatch the front portion of the freight train ahead of the passenger train. This was further accentuated by the fact that 2 more express trains were coming from the rear direction which could have suffered detention if long haul train had not been split. There was no Standard Operating Procedure (SOP) regarding splitting of long haul trains at this station. Starting a freight train ahead of an express train while the same had been waiting for more than one hour and beyond the scheduled departure time is quite unusual.

   LESSON LEARNT: Long haul trains must not be split at smaller stations. The policy and procedure for operation of long haul trains should be reviewed afresh.

7. Moreover, this was not a nominated station for splitting long haul trains. The long haul was admitted, splitted and signal given within 7 minutes. Apparently, no tests were conducted to check the continuity of brake pressure, brake application, etc. after splitting.

   LESSON LEARNT: Break and continuity tests must be conducted after splitting long haul freight trains.

8. The train was split as Control Order but there is no record of such Control Order in Control Office. It was stated by station controller during the inquiry that control order was indeed issued. However, there were no records to that effect. Non-issuing of specific orders for splitting the train was intriguing, though voice record analysis revealed some discussion between the section controller and station controller regarding splitting the long haul trains.

   LESSON LEARNT: Orders must be genuine, authenticated and their proper records kept for subsequent verification, if required.

9. A lot of communication over VHF (walkie-talkie sets) is taking place in a routine fashion for communicating with Loco Pilots etc. to start their train. There is a strong possibility that Station Controller directed over VHF to the Loco Pilot of the freight train to start the train and it was misunderstood by LP of 18006 as direction for his train. It was stated by the LP and ALP in their depositions during the inquiry that the station controller shouted through VHF to start their train. The crew of freight train were also informed by the Station Controller over VHF that their train will be split. There were many such instances of Station Controller giving orders over VHF sets at this station, which

have potential to cause confusion. During the inquiry it came out that communication over VHF set between the station controller and train crew are routine

LESSON LEARNT: Propensity of unauthorised communication on VHF sets must be curbed. No instruction over VHF should replace or supersede proper 'Authority to Start'.

10. The data logger of Jharsuguda station was defective since last 3 months and its networking had also not been done. It is fortunate that the data log pertaining to various points and signals, track circuits, slots, etc. could be retrieved from the *Event Logger* of the SSI panel. Otherwise, the sequence of events could not have been re-constructed to arrive at the truth.

    LESSON LEARNT: Data loggers must be functional at all times.

11. Speed of 18006 was 16 KMPH and that of freight train was 2 KMPH at the time of accident. The weather at the time was clear and visibility was normal under head light conditions. The SPAD was caused by a fresh crew reporting for duty after due rest, starting his train after waiting on the platform for a considerable time and then passing the signal at danger. Circumstantial evidence suggested that the crew was alert, however, his attention was diverted due to:
    i. 'Situational blindness' caused by definite expectations to get signals at the scheduled departure time.
    ii. 'Momentary loss of situational awareness' with the LP failing to remember the starter signal being in RHS not LHS of line No.4.
    iii. Both the crews being not able to see the signal simultaneously and one depending on the other. No scope for confirmation or error check being available.
    iv. S-22 from a distance appearing to be starter signal of Line No.4 being on a curve.
    v. Distraction caused by communication over VHF sets.

    LESSON LEARNT: A combination of contributory causes acting simultaneously could have resulted in this SPAD by the crew.

Photo 1 and 2: Accident site after the collision

CONCLUSION

Although prima-facie, the accident occurred due to 'Signal Passing at Danger' by the passenger train, the underlying factors and root cause of the accident lies elsewhere. Each one of the above observations that came out during accident investigation leads one to learn a lesson based on which a corrective action could be taken.

Six months after the investigation, the LP and ALP lost their jobs as a punishment for causing SPAD and collision. As an unfortunate and sad sequel to the entire episode, the ALP committed suicide after another 6 months as he was unable to sustain his family and bear the stress of losing his job. His aged father collapsed dead due to a heart attack on seeing his young son die a tragic death.