

AN ENCOUNTER WITH DISRUPTION OF KK LINE TRAFFIC BY NAXALITIES

Dayanand Sahu, Sr. DME/WAT

It was 01:00 hrs past mid night when telephone rang. As Senior Divisional Mechanical Engineer of the Division this was not unusual, but not certainly a pleasant experience. Telephone call of Railway, particularly, during night time is normally an indication of some unusual occurrence and has an effect of increasing heartbeat as if woken up by some haunting dream.

“Hello”, I yelled in the mouth piece of the phone. “Sir, there is derailment in KK line”, the control TXR on other side said, “Maoists had removed the track and one locomotive got derailed”.

“When night bundh was call by Maoists why this train movement was taking place in the section,” I murmured.

Previous day an alert was issued that the Maoists may disrupt train traffic in view of protest to Republic Day. However, that evening we were preparing for the republic day programme on next day at Waltair, as we had to woke-up early and gather for celebration of national holiday in the RPF ground.

“OK”, I said, “get further information of the full accident, damages and any injuries, etc and give feedback.”

“See, if any, ART from KRPU and KRDL can be moved during night time”. As the incident took place during night bandh in KK-2 section, I did not think of moving immediately. After half an hour again the Control TXR came over phone and informed that

“ART/KRPU has been ordered and LG special will leave from VSKP.” I said “OK “

As this was interruption to traffic on main line, Sr.DME is required to go to the site. I told the controller to inform me again when the train is ready to back to the Platform.”

I got ready by 3:45, even then by that time there was no confirmation regarding backing of LG special train to the Platform. However, I decided to go, to reach the station in time, so that, there is no delay in starting LG Spl on account of boarding of an Officer. Later, I was informed that AME/KRPU could not catch the ART and had to proceed to site on motorcycle. On reaching to the Platform, I found Sr.DEE/TRS already waiting for the train to be backed. In another 10 min time, the train was backed and officers along with some supervisory staff boarded the LG special consisting of RA and one SLR coach. ADRM RA had only four beds, so ASC/RPF was required to stay in the lounge area. As soon as, we boarded the LG Spl., we retired for sleep, so that next morning, when we reach, we had full sleep and fresh for the restoration work.

Morning around 9:00 hrs we reached to Jagadapur, where we got the breakfast from the Running Room. We got information that both side ARTs have reached to the nearby station, however, finally we reached to the KMSD around 12:00 hrs. It was informed that OHE car has gone the site, we were asked to wait there. In the meanwhile, DEN/West had also called a road vehicle from KRPU, but before

the vehicle could reach, OHE Car has arrived KMSD and we boarded the OHE Car and proceeded to the site.

We reached the site at 13:00 hrs and found that KRDL 120T crane had reached the site and preparatory work was in progress. I asked why so much delay took place in the start of the work. It was informed that although ART reached KKKLU 11:45, as the track was disturbed by the Naxalites and required to be made fit for movement of the crane on many location. Finally, the crane had reached the site with restricted speed as crane was in the front and pushed by the locomotive in rear.



Other side the rear portion was required to be cleared to make approach for the ART. Earlier, the ART was taken to the site, however, it remained far from the work site, due to the length of the train. All the material could not be unloaded and ART was sent back for clearance of rear portion. As the crane working required slewing of OHE, immediately power block was taken. After that no further movement to the site was possible as no Diesel locomotives were available. Thus the ART KRPU remained at KMSD. This experience reminded me of the importance of having diesel locomotive power in electrified section, even the LG special and ARTs were moved using

electric locomotive, which were of no use for movement to the site after taking OHE power block. Diesel locomotive is very useful and could be used as restoration equipment.

The first locomotive which was completely off the track was approximately 4.5m away and 2.5m below the rail table, held in position by one small tree. Otherwise the locomotive would have been further dragged to the 30 feet bank and could not have possibility for salvage. As the site was on bank, there was very limited space for propping up the crane. However, the expert staff of KRDL & KRPU joined together and made perfect propping. The lead technician of KRDL team Shri N. Gowda and Shri Mondal and Crane Operator Shri Ram Srinivas were confident that the Crane alone would be able to pull it near the track. I had no previous such experience, so, I had in my mind that probably handling with two 120T cranes from both sides would have made the task easier. I enquired regarding the movement of RGDA 120T Crane, which the DRM with his own experience and wisdom felt necessary to be ordered from RGDA after taking initial stock of situation site from AME/KRPU. However the crane had reached to LLGM by 16:15 hrs. There was no possibility that the RGDA Crane could reach the site by evening and asked to return it to RGDA.

There were instructions to clear the site by evening 18:00 hrs. as the threat from Maoists was not yet over. A strange feeling came to me that the Maoists must be watching our activity from nearby location and we did not know that whether they are nearby, however a sense of relief was also there as the Maoists had not attacked restoration team so far and no railway staff was directly hurt.



The 120T crane with its full might tried to take up 120T locomotive load from its CBC, however, it only gave a jerk, it seems, as if it is slipping from the bank. Our expert Breakdown staff had already tied the locomotive taking support from the tree at three points to the other side of the track using torpor wire arrangement to prevent it from moving. I had doubt in mind that whether this thin string of wire ropes would be able to contain this mammoth locomotive, which practically had no ground held in front, expect from the small tree. I had a doubt regarding the strength of tree, whether it will be able to hold or fully get uprooted. I expressed my concern to the ART team. However, they were confident that without any difficulty the work will be done. The next moment crane tried to lift the locomotive from the position as the mast pulley of the crane got tightened, ART team yelled “torpor tight, torpor tight.” Instantly we found that the first wire got its way and got broken. In another 15min time the high strength 10T wire rope was tied and with this arrangement in 4 to 5 attempts, the locomotive could be brought near to the track. The rear trolley of the locomotive had no track and required to be lifted first using HRD and then laying the track beneath to facilitate final rerailment of the rear bogie. It was seen that the coupling with the other locomotive was still not

cleared and so required to cut so that the adjacent locomotive could be moved away for making space for placing hydraulic rerailing devices. As no locomotive was available in the site for pulling the adjacent loco, it was required to pull using manual methods i.e. pushing and applying force on wheel through crowbar. I cursed the divisional control who had not given a single diesel loco to the site. With lot of effort and 30 to 40 min of efforts for placement of HRD was created and then BRD was placed. This proved to be very tricky as the entire displacement of the jack was not sufficient to make way for the rail to be placed under the bogie. It required more than three hours time for making various settings so that all three pairs of wheels of the bogie could be placed on track and required to work beyond restricted 18:00 hrs time. However, no one was in mood to leave the work uncompleted and leave the site before the track fitness is given as per the legacy of railway working. At this point of time, we stopped making communication to headquarters as some more time would be required for completion of the work finally by 21:00 hrs, complete locomotive was kept on track. The DTI at site was requested early movement, for immediate clearance of the site. The OHE team work was complete by the time. The crane is windup; the OHE & Permanent Way also required to be opened.

While the crane was winded up, the TRD and Permanent Way team could make much progress and thus ART/KRDL was then sent back to the station. We thought to make the move back to other side station in OHE car. However, DEN/West has insisted, he would stay still completion of the work which may take half an hour, we also stayed back. Finally the work was completed and the materials

were loaded and we left the site at 23:55 hrs. We reached to the nearby station by 00:00 hrs.



During the whole time, we did not bother about our food, thinking that after reaching the LG special, we will get food. However, to our surprise, we found that no grocery available on the inspection carriage, whereas little food was available in the ART KRPU. So we took biscuits and tea and went to sleep. Fortunately, as there was no night traffic movement, the LG special immediately returned back. We had asked that some food should be taken from JDB Running Room. Next morning, we woke-up at 9:00 hrs and were passing through KRPU we got good parotas loaded by Running Room/JDB. We finally reached VSKP at 10:55 hrs.

However, this gave me another important aspect of non-availability of food at accident site. I asked Sr.DSO, whose responsibility was this. He informed Commercial department should provide food. After returning back to office, I enquired with Sr.DCM that why food was not sent to the site, it was informed that they do provide food for passengers in coaching train accidents and whenever any other accident site food is provided on humanitarian basis and not as responsibility.

The entire thing gave me lesson whoever may be responsible for food, one has to take care of himself and in KK line, as outside food will not be available, sufficient stock should be carried in ART/LG specials, etc. This was going to help in coming future and even before completion of one month of this incidence another major disruption of traffic in KK-II section which also broke some of the myth and set a new strategy for restoration work in Naxalite hit KK-II section.

SALVAGING OF A DIESEL LOCOMOTIVE FROM CRITICAL CONDITION AT KAPILASH ROAD/ KUR DIV./ E.CO.R USING C.C.CRIBS AND HRE

J.V. Appa Rao, DME/SBP/ECOR

Loaded BOXN train with multi Diesel Engine derailed at Kapilash Road on heavy dense traffic of CHENNAI-HOWRAH main line of East Coast Railway on 15.03.2010. Six wagons with Multi Diesel Engine were derailed .Restoration for six wagons with one Diesel engine completed on the same day, but the other locomotive (17734/WDM2A) which was capsized/derailed in a horrible condition and far away from the track centre. Everybody thought that it can be restored neither by HRE nor by 140T BD cranes and proposed for condemnation. Cost of Diesel locomotive is worth Crores. Loco was derailed at far away distance from running track. Even it was not possible to tackle by the 140T BD cranes, as it is "out of reach" from cranes.





One day it was thought of salvaging the locomotive with HRE by using steel CC cribs. I along with my team (BD gang) engaged ourselves to lift the locomotive. First the Loco was supported initially on wooden sleepers and sand bags and finally brought it on supports of CC cribs staging made to a height of approximately 15 feet in level with the running track. Then one track was laid down temporarily on the CC cribs below the wheels of locomotives and finally connected to the running line with a curved track. No traffic block and OHE block/slewing was taken and without interrupting the traffic and the loco was salvaged and put on the running track in very few days.



It was the wonderful experience for me and my team in handling such restoration work. Finally the break down staff with their dynamic efforts and for commendable job done, were encouraged and appreciated with a cash award by the then General Manager.

' Where there is a will, there is a way '

AN ENCOUNTER WITH DISRUPTION OF KK LINE TRAFFIC BY NAXALITIES**(PART-II)**

Dayanand Sahu, Sr. DME/WAT

It was a usual day on 19th February, 2015 at around 11:35 hrs, the Control TXR informed that there is a derailment in KK-II. This came as a shocking news, as till now all derailments owing to Naxalite activities were carried out during night time. Immediately, I rushed to DRM's chamber. Only part information was available due to no mobile communication available at the accident site. DRM immediately came to Control and took stock of the situation. It has come to the notice that around 7-8 wagons along with three locomotives got derailed. The Pilot crew in the third locomotive was still in the locomotive and suffered injuries. Immediately, ARME/KRPU was ordered followed by ordering ART/KRD L & KRPU. I came back to C&W control and was consulting the strategy to go to site by road or by alternate train via RGDA. This time I had made clear that ART should be moved with Diesel Locomotive as that acts as an important restoration tool at accident site. DPC was asked to arrange sufficient number of Crew and Locomotives.

In the meanwhile, DRM had ordered movement of LG special from VSKP to the site for movement of Divisional Officers. I had asked to attach one AC – 2 tier coach in the LG special as inspection carriage has limited capacity and along with officers supervisors and other support staff also make movement. This was promptly agreed, LG Spl consisting of one RA, one

ACCW, one SLR was ordered with Electric and Diesel locomotive.

I rushed home to make my packing and got ready for movement to the site. Had early lunch by the time the inspection carriage was moved to washing line for examination and making composition with other coaches. Finally the rake was backed again at 14:10 hrs. and left VSKP 14:35 hrs. ADRM earlier had gone for footplate inspection and was to go on LG special, he returned back and stayed at Simhachalam station, again not to detain or miss the LG special. Further preparation and final movement of LG special took time and reached Simhachalam at 14:45 hrs. where ADRM along with Sr.DEE(OP) boarded the train.

It was estimated that by the time ART or LG special reaches the site, it will be evening, so no work could be taken up on date. Next day also it would require opening of section, so as the work could be started only after 11 or 12 hours this time also there was strict instructions to close the restoration work by 16:30 hrs, so that the site is fully cleared before 18:00 hrs as Naxal bundh was effective on date.

DME/VSPS had earlier gone to JDB, who visited the site and made strategy for next day operation and returned back to JDB, next day early morning they reached to the site by road. However, opening of section kept ARTs away

from the site, the LG special reached DWZ, where ART KRPU was kept.

Marshalling of ART was to be done at DWZ as KMLR station has no free space for shunting.



Initially we had planned that in the morning as the OHE slewing will take time during which the work could be started using MFD.



However, after reaching to DWZ at 10:30 hrs I had different game plan in mind, I initially thought that since very little time was left for the days work, it would be better to start working with 120T crane from both the sides. However this had one disadvantage. After re-railment of first locomotive, the crane along with locomotive was required to be sent back to KMLR and

again the crane be brought to the site for tackling the next locomotive. After discussing with Control and observing site progress of all other departments work, ADRM finally decided that only MFD should be sent first to the site and the crane working can be after clearance of the first locomotive. At 11:30 hrs, we left DWZ along with ART/KRPU which reached the site at 12:05 hrs., it was found that ART/KRDLD team had already started their work and working efficiently. They cleared three wagons.



In the meanwhile, a space for track linking was given during which all ART staff had finished their lunch. One more wagon was tackled after which as per instructions the cranes were winded up and sent back. The ART/KRPU re-railed locomotive in a most simple manner. However, as the second locomotive has no CBC, no buffer, the buffers of first locomotive were removed as the second locomotive was required to be pulled using 120T crane and moving it from the site to the station without buffer would not be feasible. The 120T crane of KRPU was brought to site, however as the time was not available the same was sent back. We came to BCHL from KRDL along with ADRM.

The ART was stopped at BHNS, already it was night and bundh time, the bridge between BHNS-BCHL was not safe to move during night bundh. It was also felt that BHNS is not safe place for keeping the crane, as damage to the crane was suspected during night time, if kept at BHNS. Finally after lot of persuasion the ART was moved to BCHL. After getting down at BCHL some of the running staff requested ADRM to give some time next day morning to them for discussing their problem which was agreed. ADRM insisted to visit hospital to see the injured LP who was shifted to WAT by that time. But other four staff were found admitted in hospital for malaria.

For next day work, we had planned to move by ART or road. However, DEN/West has already moved to the site by 6:30 hrs we also got ready and reached BCHL, where the running staff were discussing their issues with ADRM. Suddenly a call on mobile was received by ADRM and he said let us move immediately. Unaware of what had happened, we moved from the spot. ADRM ordered the vehicle to the Rest House. After reaching to the Rest House, ADRM informed that the OHE car which was sent for section opening from DWZ was set fire by the Maoists. This was again a big setback as the ramming impact was felt in everybody heart. It was further informed that the naxalites had stopped the tower car a KM away from the site and snatched the mobile phones, ordered all railway staff to get down from the car and set fire to the OHE car on gun point, using the diesel available. An order was sent for clearance of the site immediately and we were asked to wait for further orders in the Rest House. We came

to know that the halting of previous day work in evening before restoration of traffic was not appreciated by the Railway Board and somewhere we were also feeling deep in our heart that probably it was not a correct precedence to set, but today's action by Naxalites, emphasized that safety and security of staff are equally important and in the name of earliest restoration, the railway staff life cannot be left to peril. The myths that the Naxalites did not directly damage the railway rolling stock were also broken.

We were informed that district administration is arranging security forces and finally they boarded the ART on both sides and then movement was ordered. We also made a move from BCHL by road to the site, we reached to the site around 13:00 hrs.

To my surprise, I could not see any ART staff working there, although ART had reached the site by 12:40 hrs. I immediately asked the ART Incharge to come to the site on walkie-talkie. However, he came only after 10 min, I was informed that security personnel had restricted them to step out of the ART only after security clearance. Finally the work has started. The crane was propped, the wagon was emptied but we found that with all, this wagon was infringed with other grounded wagon on the other side with a huge tree. In bottom the wagon components were also infringed with other wagon debris. Initially what looked to me as a 20min job actually took more than three hours. And as per instructions given, we had to stop work after 16:30 hrs.



In the meanwhile, the ART/KRPU moved to the site, had to clear the burnt OHE car. It was decided to push this OHE car to the site with crane. There is slewing and re-slewing of OHE at the location and would take more time, so the crane started pushing the burnt OHE car would start at 14:15 hrs. We thought that the grounded the OHE car would be easier and may be done in half an hour time. However, to our surprise we found that the pockets for fixing the crane hooks were not accessible due to fixing of hydraulic and electrical pipes. So, finally it was required to be handled from one end only. Once the one end of OHE car was kept on ground, its wheel was buried in the earth as it was a four wheeler vehicle and it was not possible to further move or rotate. The crane was required to be brought closure and held from the other end and applied full force to throw it on the ground. The entire activity further took more than an hour time and left least possibility for putting it on track on the same day. The other possibility could have been to carry the OHE car to the station and then send the crane again to the site by pushing. However, the burnt OHE car was still emitting smoke at the time ART/KRPU reached. It was also not sure whether it's

undergear parts would allow it to travel to reach to the nearest station. Finally we felt that the decision taken was alright.



The crane was now brought near to the second derailed locomotive and once the locomotive is held on one end by CBC.



The position of the locomotive is such that its one wheel was locked in the track and once it was tried a little bit left from rear, the other side was in tilted condition started further down, so it was clear that loco cannot be worked out with one crane so it was also waiting for KRDL crane to come and assist.

After clearing the first wagon, the other wagon was dealt by ART/KRDL with the same position

in no time. Then the crane was advanced to tackle the Second locomotive. There were repeated orders from the higher authority to windup the work. The recent developments in the last 20 min had encouraged everyone to take a little bit of chance and clear the site on the day itself with great enthusiasm. The Crane was again brought, all departments worked together so that the preparation time can be minimised and both cranes were ready to lift the locomotive. However, one traction motor cover bolt was locked in the rail and whenever crane tried to lift the locomotive, the track along with the sleeper was also getting lifted. Two to three attempts were made, however no success was seen, finally it was decided to cut the cover bolt using gas, but as there is Cadmium compound in the traction Motor, which can easily catch fire. DEE/TRD warned not to use gas cutter. Fire extinguisher and water buckets were brought near and bolts were cut. Alternatively the rail could have been cut and released; however, it would have delayed the rerailment as it was required new rail to be fixed before completion of rerailment. This actually worked and big jerk was given with which the rail was freed and the loco could be lifted. Rest of the work was only simplest of thing, which was done within no time and finally the rerailment was completed at 17:30 hrs.

Orders were given for quick windup. However, some more time was required for ART/KRPU as

side buffer of the rerailed locomotive was not seated properly. It was done quickly and finally both the ARTs left site at 18:05 hrs.

We had a sense of achievement, as we can clear the site and no work was left for the next day. Track linking in the meanwhile was completed however, OHE restoration required next day's work. We quickly cleared the site and returned back to BCHL.

A third locomotive was also there in the site which is far away from the reach of the crane. In earlier occasion four numbers of locomotives were also left in the site which required lot of working, so this time it was tuff to make a strategy and tried to salvage this locomotive, it was thought that the trolleys would be released using gas and then the locomotives were brought on the track using both the cranes. However, the two days work done in the site made it pretty clear that this strategy would have been successful in salvaging the 120T locomotive, which would also endanger the crane safety as even the empty wagon created lot of problem on the same side.

At the end, we felt that all our strategies were worked well and we could clear such site under cover of full security and time constraint very successfully.

MY EXPERIENCE OF RAILWAY & ACCIDENTS**D. Nandi, Retd. ADME/WAT**

I was appointed as Train Examiner in the year 1983 and posted in Khurda Division at Khurda. Being a fresh appointee into Railway service, I do not know anything about Railway working procedures and activities and there was lot of confusion and fear in mind. Basically, Train examiner duties are critical and always engaged with train examination, train passing, trouble shooting and to ensure safety of the train till it reaches destination.

One day, I heard some unusual sound coming for a longer period repeatedly and I am puzzled to acknowledge it. On inquiry, my colleague told me that it is Hooter for ordering of ART/ARME, as some accident might have taken place somewhere and its purpose is to alert concerned officials to attend accident site for restoration. On hearing this, I was anxious to know, what accident is, where and why it happens, and what the officials do at that site. Then my colleague told the officials will take rescue operations at site and ensure restoration work to bring the traffic to normalcy. Some of my colleague staff, after returning from accident site used to discuss about various activities performed there like track reading, wagon reading, restoration work, track linking etc.

Hearing this, I was more anxious to have a glimpse of the accident site and witness the various activities being performed there and also keen to know what are ART and ARME and how the staff travel and how they stay at accident site. Being a new entrant I was not given opportunity to

attend accidents. Day by day, my anxiety has grown to be a part in rescue operation.

One day while performing duty from 0800 hrs to 1600 hrs at about 15 55 hrs, I heard hooter sound for ordering of ART and to attend derailment in between RTN-BBS where one goods derailed and blocked both Up and Down lines. Immediately I rushed to the loco shed from where the ART is likely to departure and I boarded the train without informing anyone. On arrival, on witnessing the accident site I got baffled, how the situation can be made normal. All the staff from ART got down and immediately gone to their respective places to attend restoration i.e. taking joint readings, preparation for restoration work by Crane, taking snaps/video of the site, taking clues etc. Two to Three staff remained in the ART for preparing food to all staff. Lot of people are roaming here and there at site and everybody discussing regarding responsibility of accident.

In the mean while, my Sr.DME arrived and I met him. He enquired why I came there and how. I replied after completion of day duty, I boarded the ART and arrived to site to know what is the purpose of ART, what the people in ART will do at site and what is track reading, wagon reading, what is restoration and how the officials tackle the situation and how normalcy will be achieved.

Sr.DME appreciated my zeal, instructed to accompany with ART Incharge who is taking the track & wagon readings, ensuring restoration work and preparation of joint findings. Accordingly, I associated with that gentleman right from taking readings till completion of restoration next day

morning. While recording the track readings, I have observed the Senior Subordinates of both Mechanical and Civil Engineering departments quarrelling with each other and I could not understand, why? I tried to know from Mechanical representative, in turn he advised me to go home, it is not your job and it required skill and experience.

In the mean while, my Senior Inspector came to know that I am at site and wanted to know about subject. He had taken permission from Sr.DME and entrusted me to take readings along with nominated Mechanical supervisor. Since, I got permission from my Sr.DME, I associated the group for taking readings. My enthusiasm in the subject was appreciated by the Senior Subordinates of Civil Engineering department and the recording of readings was completed successfully. After taking reading and completion of restoration work, I returned to Headquarters. On arrival I observed everyone right from Sr.DME and to lowest cadre were discussing about the accident and its restoration work and were planning to face the inquiry.

With the moving time, I was also promoted as a Sr. Supervisor and posted as ART Incharge to take care of ART/ARME maintenance and restoration works.

I narrate my personal experiences at site which brought me laurels.

1. Four BOXN loaded wagons derailed at SSPR yard and ART was ordered. DME and ADME have accompanied ART. On arrival at the site, we the Break-down Supervisors and staff were discussing for placement of Crane and easiest methods for lifting the wagons. DME in a hurry ordered to place the crane at a place which

is not suitable for its operation. But obeyed his orders but could not succeed. Finally ADRM has interfered and advised me tackle the situation as per my experience. Then I ensured to place the crane at an ideal location and could lift the wagons easily and rerailed by a single prop. ADRM felt very happy and DME also recognised my experience.

2. 12 four wheeler tank empties derailed in Bhadrak section while passing on Up line. Resulting in blocking of both Up and Down lines. On arrival to site along with Sr.DME, it is seen, 8 wagons derailed on Up line and spread in different locations and remaining 4 wagons infringed the down line. At site DRM was available and surveyed the site and instructed Sr.DME and Sr.DEE (TRD) to place the crane, first on down line. OHE is slewed on down line for Crane operation. Subsequently similar process to adopt to Up line, I have suggested Sr.DME in the presence of DRM, "Sir no need of OHE Slewing on down line as the down line tank empty can be removed by placing on Up line also. DRM did not agree. He had stucked to his earlier instructions and gone to Bhadrak station for refreshment. Again I requested Sr.DME and Sr.DEE (TRD) to rethink for my proposal so that 8 hours time can be saved. Both the officers agreed for that and crane was placed on Upline and four tank empties were removed from down line within 2 hours only. DRM returned to site and enquired Sr.DME how it was possible to clear down line within 2 hours and he explained the action taken. DRM had appreciated my planning.

With the knowledge I have gained in attending restoration works, I could function very easily with wide acknowledgment and appreciation from my superiors and among my staff.

LAUNCHING OF BRIDGE GIRDER IN KOTHAVALASA-KIRANDUL SECTION **A POST HUD-HUD EXERCISE**

Dayanand Sahu, Sr. DME/WAT

After the office hours, I was returning back to home, I asked my driver to turn the vehicle towards the market, so as to buy some plastic water tanks for storage of water. The Driver was surprised, "Sir, why you need plastic water tank? there is good capacity water tank in the roof top of your house. I said, "Did you not hear cyclone Hud-Hud is going to strike VSKP tomorrow? He rejected the idea saying that "Last year also similar warning was issued regarding cyclone Phailin and practically no impact was felt at VSKP, he said. "Sir, VSKP is protected by hills and Lord Simhadri Appanna at Simhachalam, will not let any natural calamity to occur in the city. Even if the cyclone struck VSKP then also it will get diverted."

I was amazed with the self-confidence but just wanted to be on safe side, as although Phailin did not fall on VSKP, it certainly impacted Bhubaneswar last year, of which I had personal experience. Bhubaneswar although was away from the sea shore, the winds blew away many trees, electrical poles and damaged water lines due to which the water and electrical supply were affected for 3 to 4 days. Under such situation keeping stored water certainly would be of great help. I purchased two 100 litres tanks and kept them filled with water. We had also stored drinking water in all drums and actually thought that probably nothing would come.

However, as it occurred, heavy wind with over 200 KMPH speed actually struck Visakhapatnam city and it remained for more than 12 hours with brief relief, when the "eye of storm" passed, leaving lots of devastation behind it. The electrical supply was completely damaged, as most of the trees were uprooted. The trees had also caused damage to the water lines. With the precautions, we could

survive for two days and the stored water got empty. Soon, I realised restoration of water and power supply will take more time and it would be better that family goes back to native place, as I had myself to participate in the restoration and rebuilding of our work areas, I could not go.



While the life in general fully got dislocated with house roofs blown away and damages due to wind and rain, many people were literally on the street. The Hud-Hud also caused damage to Railway system. Main line had breaches and TRD failures. Although due to stoppage of movement of train by previous night, no other damage occurred and most of officers remained in their houses during the storm. Some of the brave hearts were required to come to the Control, leaving their family at stress at home in the midst of the storm and as the wind subsided to below 100 KMPH. In fact, Railway teams went to the site for restoration of the line and so did it successfully within twenty four hours. But still traffic could not be moved because the line ahead in South Central Railway was not yet restored and took more than twenty four hours time further. The trees also blocked the road and approaches and were required to jump, over the branches to move.

While we were busy taking stock of damages in our work centres, news also came, that a heavy 30m long bridge girder was swept away by the inundation caused in the KK-I section and everyone was clueless initially how to make restoration at that site. As the incident occurred in location, which practically has no road approach, the requirement of railway Crane for the above operation was felt necessary. And Breakdown team was sent to see the site and make joint action plan with the Bridge Organisation.

In the meanwhile, a similar abandoned bridge was located nearby, which was abandoned due to collapse of a tunnel in the year 1983 and remained there since then. However, dismantling that bridge structure and shifting it to the required location would again require high capacity road Cranes for which temporary approaches would be required to be constructed. As KK line traffic was badly affected, the railway was trying to find solution to reduce the days required for completion of work to minimise. In effort on the above line, finally one similar girder was further located in the other side of the country i.e. Ahmedabad and was decided to transport it to Visakhapatnam.



I was also asked to visit the site along with Sr.DEN/Co and Sr.DEE/TRD to see that this girder launching should be completed in a minimum time. It was a unique experience after

driving about two and half hours, we reached near Tyda station from there around 500m to be climbed down on foot to reach the station, where a motor trolley was kept ready. We went to the site on a Motor Trolley through the tunnel and bridges, one side high mountain and the other side deep valley. While deep inside the tunnel, I had a strange feeling, suppose if a train comes from other side, there would be no escape. I shared my feeling with Sr.DEN/Co, who said “yes” there was always an element of risk and in recent past, one such accident occurred in the tunnel in which some staff died.



Finally, we reached to the site. There was no connection to the other side of the bridge. It clearly indicated that probably the uprooted trees, slipped heavy rocks and mud had blocked the water passage under the bridge and when the water pressure increased it swept away the track and girder along. The girder, in damaged condition was later spotted three-four KMs away from the site in KR section.

I was really surprised that railway staff, work under such situations, while patrolling during rainy season, the risk of wash-outs was always there and every year some breaches, washouts certainly occur in KK section.

We tried to understand the work at the bridge site and then tried to make the flow chart for the sequence of various operations. The bridge was in curvature and another bridge was nearby, one side mountain was obstructing rotational

movement of the Crane and other side practically there was no space to keep the girder or other equipment. The Civil Engineers said that right side they will make level by cutting rocks and make space for rotation of the Crane.

It was planned that first the Crane would be sent to the site and match truck would be taken back to the station then, the girder placed in BFRs would be sent to the site, which will be picked up by the Crane and then turn 180 degrees, bring in line of the track and moved slowly towards the bridge as the girder length was more than 10m, was to be handled carefully, so as to not to hit the Crane body. The Crane then, should reach to the edge of the pier and slowly drop on the temporarily erected dummy girder over which it was to be pulled using manual methods to the other side of bridge. To support the above arrangement, temporary scaffolding to be raised to take the load of the girder and one by one, three piece girder to be launched.



As there was curvature, the opening of OHE wires seem to be difficult, however this could be done before hand.

We returned back to the Divisional headquarters and then became busy again in restoration at our work centre. Initially, approaches were made by removing trees, cutting them into size using tools available in the ART, by the staff, clearing the site, etc., protecting the machines using tarpaulins, etc.



In the meanwhile, COM visited Visakhapatnam to see when the freight services could be fully resumed. The electrical supply was resumed only after a week's time and water supply was still not resumed in the work centres, as the supplying pumps were submerged in water and damaged during Hud-Hud. Initially, the coaching services were normalised slowly. We started freight maintenance during day time. As the electrical fittings were vastly damaged, the night illumination could not be resumed, even when supply was restored. Some temporary arrangements were made and with that night activities were also started. The main line traffic was normalised and then the call for launching of the bridge girder was received.



The Crane was dispatched a day before, so that, launching activity could start early morning next day. We reached Tyda station by road again, this time we went to the site along with Crane. A lot of work had already been done by the Bridge Organisation and Engineering Branch. However,

we found after reaching to the site that the OHE wires were not slewed.

When enquired, AEE/TRD said that they had visited the place previous evening, but was not sure about slewing of OHE. I felt there was communication gap in expressing the pre-requirement for Crane working. Nevertheless, we encouraged the TRD team to start and try to complete the work as early as possible. However, it almost extended up to 12:30 hrs., after which the Crane working could be started.



In the meanwhile, the first girder in BFR was brought to the site and was lifted by Crane and kept in position and slowly it was moved to the edge and lowered on the dummy girder with clinical precision. I really appreciated the perfect work done by the bridge organisation without leaving anything to chance.



The Crane was sent back and slowly the first girder was pulled to its position. CE/Br had indicated his full satisfaction on methodically and systematic working. The BFR was sent back and the second girder which was to be launched was brought to the site again. Somehow, it could be



put to position properly and then finally the third girder was also brought.

However, placing the third girder was tricky, as now there was space constraint. It took little more time to set it in position. Lights were on, but before complete darkness engulfed the valley, the girders were placed in right position.



We felt very happy and jubilant that entire exercise was completed in the same day and practically no difficulty was experienced. It was possible due to rich experience of Waltair Breakdown team in participating in many girders launching activities previously. Particularly, the rich experience of Crane Driver Shri Bhaskar Rao was very useful. It would be a real challenge in times to come, when Waltair team have to work without Shri Bhaskar Rao as he would be retiring from Railway services on superannuation shortly.

HANDLING THE DISASTER WITH OWN HAND

Ch. BHASKAR RAO
Retd. Crane Driver, Visakhapatnam

I joined Railways in the year 1973. I got the opportunity to work as Crane Driver from 1982 and in Brake Down operations since 1987. In my service of 28 years as Crane Driver, I had participated in several restoration operations involving both Passenger and Goods trains in WAT division as well as in other divisions of erstwhile South Eastern Railway. I participated in restoration works of passenger trains such as Link express at Mandir in 1987, three Faluknama Express derailments at Kaiapara Road, Ganjam and Kalpraghat, Gurudev Express at DVD, Ernakulam-Patna express at Palasa. As for the goods train accidents concerned, they are countless. Derailments in KK-II section of WAT division ranks number one due to frequent interference by Insurgents. And in most of the cases, Crane is essential for restoration and I was there in it.

With all that experience, I could gain the confidence of my Superiors and I was given a free hand to carry out the crane operations. Though my working place is at WAT, there are other occasions I was taken to other Divisions also for restoration works.



I got the opportunity to work with different types of cranes like Steam Cranes namely Crown Seldown 65T, Hercules 75T, Big Ben 65T and Veera Hanuman 65T all are made in England, 120T Diesel Crane was made in USA commissioned in 1970, in which I worked as Khalasi and later on I got to become its Driver from 1987. The mighty 140T Crane standing tall at VSKP is made at Jamalpur and commissioned in the year 2004.

Even working for several years on different Cranes, I admire working with 120T Diesel Crane which works for its speed and safety, which is sturdy and works on pneumatic system. On the other hand the Steam Cranes are also sturdy and safe but lack speed. The working of 140T Diesel Crane is cumbersome, it should be fixed with counter weights and other procedures have to be followed, which takes a minimum of two hours. It works on hydraulics, keeping the Driver tense and he should be more cautious on every movement otherwise the crane may get toppled. Therefore, working with 140T crane is not so easy.

Irrespective of the type of Crane, a Crane Driver shall follow the laid down procedure while operating and should not be hasty and adopt shortcuts for early completion of the work endangering the safety of crane as well as the staff. Firstly, a Crane Driver should ensure that the crane is well secured with its riggers and other supports, before it starts working. Secondly, the Crane Driver shall observe the working track, super elevation of the track,

ensure jib radius shall always remain as per the requirement, slewing angle should be kept invariably 45 degrees only, if the Driver feels confident he can cross the limits, however, if it exceeds it goes into an unsafe angle or dead angle. Driver should always ensure that crane shall remain in his control and Driver should follow the instructions of the Officer in charge on site, who happens to be a Mechanical Officer.



There was an incident of toppling of 140T Crane (143006) of KBJ BD of SBP Division in the year 2006 due to improper securing. Actually, the crane was ordered for girder launching over a bridge between BDJX-KHPL. During the process of putting its match-truck along-side of the track for taking up the girder work, the wet soil under the rigs could not withstand the Crane's weight, the soil gave way and caved in and the crane got toppled and slipped into the adjacent fields. There was rain in the area the previous day. This mishap crippled the girder launching work. At the time of derailment, one AME was also there in the crane. Though there were no injuries to the crane Driver or any other staff, another 140T Crane has gone all the way from WAT to re-rail the crane. Therefore, the Crane Driver should always think for the safety

of Crane as it may jeopardizes the entire restoration process at accident sites.



As for the accidents sites I attended in my career, I felt very serious was the rolling down of a goods train in KK line during 1995 and colliding with another goods train waiting at CMDP station yard. The main cause of the accident was leaving the train unguarded by the crew, to check the snapped OHE wire in the mid-section. As this section, happens to be on a down gradient, the entire rake with its three electric locos and 55 wagons rolled down and collided with the train standing in CMDP yard. Guard of rolled down train and Engine Driver of the standing train lost their lives. The body of Guard could not be sited till removal of nearly 25 mangled wagons. The accident site was so worst that the all three locos of rolled down train derailed and the 54 wagons completed crushed the engines of standing train. The entire yard looked like a stack yard of crumpled iron with mangled wagons and locos.



At that time, I was Crane Driver at KRDL, I joined the operation from KRPU end and WAT Crane was working from the other end. Due to inclement weather there was continuous rain at the time of restoration. The terrain is also not supportive with one side a mountain and the other a valley, Crane working was very difficult. In addition to the weather and terrain, the station is crammed with OHE equipment, leaving little room for maneuverability for the Crane to work. However with all these constraints and by the encouragement of then DRM and other officers, the site could be cleared within three days against the earlier forecasted restoration time of five days.

Even in such conditions also a Crane operator shall always dedicate himself in his duties with patience and work for the safety of crane and his co-staff.

I can say it is not exaggeration to mention that the primary responsibility of a Crane Driver is to work for the safety of crane and then participate in the restoration works. He shall not bother about the time factor during his work and shall concentrate in minimizing the

loss to railway property giving highest priority to safety with utmost concentration and planning.



I am very thankful to all my Sr.DMEs and Supervisors, who were very supportive and cooperative during my entire career and appreciated me during my good work and supported me when I failed, because of which I could succeed and won accolades and several awards including Railway Board award during 2012. I am satisfied with entire railway service joining in 18.06.1973 and I am retiring in March, 2015.

RERAILING INSIDE THE TUNNEL – MOST DIFFICULT RESTORATION EXERCISE

Dayanand Sahu, Sr. DME/WAT

FIR received at 5:40 hrs and ART/KRDL, ART/KRPU and 120T Diesel Crane alongwith ART of VSKP ordered immediately. ART/KRPU reached the site at 8:30 hrs and rerailed the 46th wagon from Engine at 10:50 hrs, 47th wagon from engine at 12:15 hrs and 48th wagon from engine at 13:45 hrs. ART along with three rerailed wagons and two wagons were sent back to JRT at 15:00 hrs.



ART/VSKP reached JRT at 15:20 hrs, however MRT train was given precedence to go to the site for unloading of 2 Nos. machines required for quick unloading of the wagon at the site. ART/VSKP Staff alongwith chain for pulling the wagons boarded the MRT train and reached to the site at 16:35 hrs. After unloading of the

machine, the ART train was sent back to JRT and ART/VSKP was dispatched to the site at 18:30 hrs, which reached site at 18:50 hrs.

In the meanwhile, ART/KRDL reached to the site at 15:55 hrs., however required to wait till 19:10 hrs for track related work at 20:25 hrs. Then 56th wagon was rerailed by MFD/KRDL locomotive at KRPU end. Again, site was allowed for temporary track linking up to 21:35. Wagon lifted at 22:20 hrs after which track under the lifted trolley continued up to 00:50 hrs. The 55th wagon leading trolley rerailed at 1:15 hrs and pulled ahead at rear trolley rerailed at 2:45 hrs.



The temporary linking was done up to 3:35 hrs and MFD/KRDL was deployed from 3:35 to 4:15 hrs for lifting 54th wagon provided track inside the lifted trolley from 4:15 hrs to 8:00

hrs. The 54th wagon from engine was rerailed at 8:25 hrs by MFD/KRDL.



On JRT end after completion of track work and unloading 49th wagon which was in capsized condition 120T crane was placed inside the tunnel in Jib lowered condition at 00:00 hrs. As enough space was not available, JRT end of 49th wagon was hold by 120T crane and tried to pull, however the CBC shank which was cut using gas previously was not detaching and required further cutting. Finally the wagon was pulled out of the tunnel at 3:10 hrs and grounded at 4:10 hrs around 50m away from the mouth of the tunnel, as clear space for grounding of wagon was not available nearby.



For tackling the 50th wagon again track linking was required, which started at 3:20 hrs and given at 7:00 hrs. 120T crane was brought inside the tunnel at 7:10 hrs. The trolley of 49th wagon grounded at 7:40 hrs and 8:10 hrs. The 50th wagon was then hold on the crane hook from one end and pulled out of the tunnel and grounded at 10:15 hrs. The two trolleys of the wagon were grounded at 10:45 hrs and 11:00 hrs respectively.

For tackling the 51st wagon, again track linking is required which was done from 11:00 hrs to 16:00 hrs, 120T Crane was brought in at 16:15 hrs. To avoid damages to the temporary laid track, initially efforts were made to lift the wagon and pull out of the tunnel. However, clear lift could not be achieved and therefore, it was required to be pulled from one end only, which pulled out of the tunnel and rerailed using 120T crane at 17:25 hrs.



Till this time only two wagons i.e. 52nd and 53rd from engine were left, Engineering team expressed that unloading of the wagons completely, would take 6 to 7 hrs time. Therefore, it was decided that efforts will be

made to tackle these two wagons immediately after completion of the track related work.

In KRDL end, the Engineering block was taken from 8:30 to 11:00 hrs to link the track, up to the wheel of the wagon. From 11:00 hrs to 11:40 hrs, the wagon was lifted using MFD jacks. From 11:40 hrs to 13:50 hrs again engineering work for placing track under the derailed trolley was undertaken after placing of track using MFD from 13:50 hrs to 15:50 hrs, the trolley of KRDL end was placed on the track. After putting KRDL end trolley on the track the loco was attached and tried to pull. However, it did not move.



The KRPU end trolley was lifted from 17:30 hrs to 18:30 hrs. Engineering team worked for providing temporary track from 18:00 hrs to 20:00 hrs. MFD work started from 20:00 hrs for putting leading trolley on the temporary rails. The leading trolley was rerailed on temporary rail at 21:00 hrs. It was a loaded wagon and the temporary track was not having exact gauge, the trolley was also not moving freely. Multiple attempts were required to put the rear trolley on track and finally it was rerailed at 23:45 hrs.



The 52nd wagon was also simultaneously being tackled by ART/KRPU team from 21:00 hrs after track work. The leading trolley was lifted from 21:00 hrs to 22:00 and temporary track was provided up to 23:05 hrs. Again MFD work up to 23:35 hrs followed by track related work up to 00:45 hrs. Efforts were made to reraile the front trolley using MFD, by providing sleepers/rails under the leading trolley from 1:05 to 4:45 hrs. However, the same was not successful as only front wheel could get the gauge and rail behind it was not straight. By linking the track in front of the wagon by providing additional sleepers and with the help of single and multiple Diesel unit, efforts were made to pull out the loaded wagons which was not successful. At 5:40 hrs it was decided to unload the wagon, clear the infringement from the rear trolley and place the rails under rear trolley to minimize the resistance for pulling out the wagon, which was completed at 9:30 hrs. Again attempts were made and this time it was successful, the wagon was moved ahead for about 20m and then rear trolley was first rerailed at 10:10 hrs and leading trolley was rerailed at 10:45 hrs.

Track fit was given at 13:00 hrs

OHE fit was given at 13:45 hrs.

(A) TIME FOR MOVEMENT OF ARTs TO SITE:

	Order Time	Site arrival	Time taken
ART/VSKP	06:00	18:50	12 hrs 50 min
ART/KRPU	05:40	08:30	02 hrs 50 min
ART/KRDL	05:40	15:55	10 hrs 15 min

			using loco, only one pair wheel on loco, not successful
18:00	20:00	1:55	Clearing of debris and unconnected temporary Track under the front trolley of 53 rd wagon (loaded)
22:15	23:45	1:30	Simultaneous work with the ART team for rerailling rear trolley
		19:45	Total Time

KRPU END:

(B) TRACK LINKING RELATED WORK AFTER ARRIVAL OF ART AT SITE

KRDL END:

From	To	time	Activity
15:55	19:10	3:15	Track reading and preservation of clues
20:15	21:35	1:20	Track linking to approach 55 th wagon
22:20	00:50	2:30	Track linking under the rear trolley of 55 th wagon
02:45	03:35	0:50	Track linking to approach 54 th wagon
04:15	08:00	3:45	Track linking under the rear trolley of 54 th wagon
08:30	11:00	2:30	Engineering block for clearing of site
11:40	13:50	2:10	Removal of debris and track linking work
15:15		-	Efforts made to pull

From	To	time	Activity
18:50	23:45	4:55	Track linking for approach of 120 T crane for 49 th wagon (Empty)
03:20	07:10	3:50	Track linking for approach of 120 T crane for Trolleys and 50 th wagon (Empty)
11:00	16:15	5:15	Track linking for approach of 120 T crane for 51 st wagon (Empty)
17:25	21:00	3:35	Track linking for approach of 52 nd wagon (loaded)
22:00	23:00	1:00	Clearing of debris under front trolley
23:35	00:45	1:10	Track under front trolley of 52 nd wagon
01:05	04:45	3:40	Track under front trolley

ENCOUNTER WITH RAILWAY ACCIDENTS

			of 52 nd wagon
6:30	09:05	2:35	Unloading, removal of infringement from rear trolley and placing rails under the trolley
10:45	13:00	2:15	Track work after completion of rerailment
		28:15	Total Hours

(C) TIME TAKEN BY ART FOR RERAILMENT:

KRPU

From	To	time	Remarks
46th wagon			
8:30	10:50	2:20	Unloading & shifting of material and Rerailment on both ends trollies
47th wagon			
10:50	12:15	1:25	Rerailment of both ends trollies
48th wagon			
12:15	13:45	1:30	Rerailment of both ends trollies

KRDL

56th			
19:10	20:50	1:40	Cleared infringement & pulled by loco to create gap & rerailment of front trolley, Removal of hydraulic jacks
55th			
00:50	02:45	1:55	Both trolley rerailed one by one.
54th			
03:35	04:15	1:05	Rear trolley rerailed.
08:00	8:25	0:25	Front trolley rerailed by pulling with loco
		01:30	
53rd			
11:00	11:40	00:40	Lifted one side.
13:50	15:15	01:25	MFD on rear trolley
15:15	16:00	00:45	Efforts made to pull

			using loco, only one pair wheel on track, not successful
16:00	17:30	01:30	Shifting of MFD to front trolley and lunch
17:30	18:00	00:30	Lifted Front Trolley
20:00	21:00	01:00	Rerailed front trolley on unconnected track
21:00	22:15	01:15	MFD shifted to rear trolley & lifted
22:15	23:45	01:30	Simultaneous work with the PWI team for rerailing of rear trolley & track work
23:45	01:30	01:45	Pulling using loco and rerailing of front trolley
		10:20	

120 T VSKP

49th			
00:00	03:10	4:10	Pulling out
03:10	04:10		Grounding
50th			
07:10	11:00	4:10	4 trollies & 1 wagon body pulled & grounded
51st			
16:00	17:25	1:25	Pulled out and rerailed.

ART KRPU

52nd			
21:00	22:00	01:00	Loaded wagon - Lifted leading trolley
23:05	23:35	00:30	2nd time lifting for track work
00:45	01:05	00:20	Simultaneous work with PWI team
04:45	05:15	00:30	Removal of Jacks and Pulling using one single and one multi loco, unsuccessful
05:40	06:30	00:50	MFD Shifted to rear trolley to lift and clear infringement, etc.
09:05	09:30	00:25	Removal of Jacks
09:30	09:40	00:10	Pulling by loco
09:40	10:45	01:05	Rerailed both trolley on proper track
10:45	11:30	00:45	Loading of equipments in ART
		05:35	Exclusive MFD time

CASE STUDY – DERAILMENT OF 120T CRANE WHILE LIFTING BRIDGE GIRDER FROM BFR

The Section Controller of KRDL-KRPU board of Divisional Control Office/Waltair had informed about the derailment of the 120T BD crane at 17:35hrs. of 02-11-2016 while working girder launching work between KMSD-KKLU.

Restoration:

Restoration works were started with ART/VSKP at 07.55 hrs. Crane rerailed at 16.10 hrs. Old girder replacement work started at 16.50 hrs., completed at 18.30 hrs. Track fit was given at 19.15 hrs. with 10 Km/h speed restriction from Km. 352/17-20 but crane detained at site for coupling of crane match truck which was on the bridge due to banner flag put at site upto 20.00 hrs. ART with crane left at 21.15 hrs. from site. OHE car in section (over the bridge) attended the re-slewing of OHE and fit given at 22.05 hrs. OHE car arrived KMSD at 22.20 hrs. First train, No.D/KOKG left KMSD at 22.21 hrs. and passed over the affected bridge during 23:23 hrs. to 23:24 hrs. of 03-11-2016.

Interruption to traffic:

The interruption to traffic on the KK line Ghat section was for a total duration of **30 Hours 34**

Minutes and during the period, the trains were suitably controlled in the section.





The various aspects of the crane operation and safety is discussed in following para –

(A) **Prior Site Study** - Team of Supervisors and crane operator have visited the site on 24.07.2016 for familiarization of site, nature of work and planning. There is no inadequacy observed in assessment of nature of work and its planning.

(B) **Condition of the crane** – The crane has completed its codal life, however continued in service as no suitable replacement was available. It is to mention that 140T BD crane has not been

found suitable for working in KK – Line. Further, it was last POHed at KGPW on March 2013 (Return date 3/18) and working successfully in many accident sites. Recently the same crane was utilized for rerailling of locos and wagons on 05.08.16, 20.08.16 and 21.10.16 From above, the crane is in good working condition, however, due to overage it is having breakdowns and reliability issues.

After the rerailling, the same crane was utilized for placement of old girder in position without any further trouble.

(C) **Competency of the crane driver** – The crane driver has earlier worked as Crane Driver Gr-III from 19.06.2007 to 24.06.2010 at ART KRDL. He was working at Central Sick Line from 25.06.2010 to 08.01.2016. Further, he was promoted to Crane Driver II and posted in BD VSKP. He was deputed for the above work as Crane Driver KRDL Sri K. K. Murali was on leave. He has also attended training on Crane operation from 27.6.16 to 26.7.16 at JMPW. After promotion to Crane Driver Gr - II , he was deployed in 9 occasion to work with 120T BD crane. From above, it is clear that the crane driver is competent to work with 120T BD crane. In fact he efficiently handled the old bridge girder and moved it back and placed at proper location without any trouble.

(D) **Propping of the crane** – It is found that for lifting of New girder from BFR and slewing it to 180 degree to bring it in front of the crane, right side two nos. prop were provided as the load was

to be moved from right side of the crane. From load chart, it is seen that for a radius of 12 m, 30.5 T with Full Prop and 6.1 T while Free on Rail could be lifted with the crane.

While placing the old girder, propping was done, however, fresh propping were required for making way for 180 degree slewing for the new girder. With two prop in position, it was assumed that it would safely handle the load of 16 T girder. However, as per statement of the crane driver, when he was just trying to slew the crane, the farther girder prop failed and the crane tilted rightside causing the New girder to sway which could not be controlled.

The witness at site also observed this uncontrolled swaying of girder and thought that it is fast slewing of the boom.

It is further found that, the propping at farther end of the load has failed while the nearer one remained intact. This may happen either due to excess load coming to the farther prop or less reaction generated by it. From the position of the load, it is clear that, normally more load shall be subjected to the nearer prop than the farther prop. This suggests that the support from formation below the packing was not adequate enough to take the load which has resulted in failure of the prop.

Normally, whenever, sinking of prop is observed at site, the load is dropped/released and propping base is reworked by providing sand bag, ballast, more wooden packing etc, but in instant case, it seems that the prop failed suddenly, without

giving any indication of sinking, which was not observed by any person at site.

It is also found that safety clamps were not fixed to the rails, which could have provided safety in case of failure of prop, thus allowing the 120T crane to derail.

While rerailling the crane, MFD jacks were placed and during that time also sinking of base was observed which was required to work several times before rerailling of the crane.

Thus, inadequate propping, non provision of safety clamps alongwith sudden sinking of prop base have caused the derailment of the Crane.

(E) **Role of Crane Supervisor** – SSE (C&W)/KRDL Mr. AN. Anant Raju had personally visited the site and was also deputed to supervise the crane work. He is working at KRDL from 11.7.2014 and has worked in many derailment site successfully. He is also recipient of CME level award during Rail week in 2016. However, he failed to make proper assessment of the formation condition, observe the prop during lifting and has not ensured fixing of rail clamp for safety.

Conclusion: Inadequate propping, non provision of safety clamps alongwith sudden sinking of prop base have caused the derailment of the Crane.