



**INFORMATION BROCHURE**

**MECHANICAL DEPARTMENT**

**KONKAN RAILWAY CORPORATION LIMITED (KRCL)**

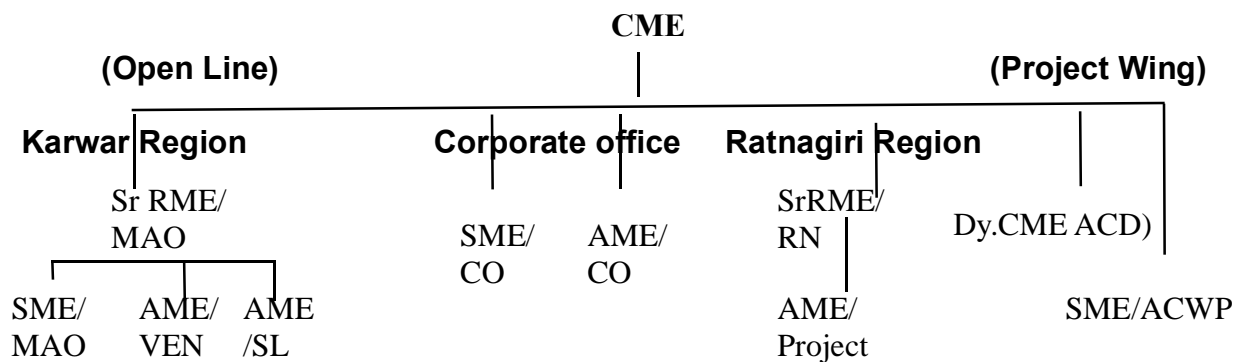
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## MECHANICAL DEPARTMENT

Mechanical Department plays a vital role in the organization by providing its support to both train operations and project division.

The department is headed by Chief Mechanical Engineer and he is supported with officers and staff at Corporate Office, Ratnagiri and Karwar regions and also at NF Railway to look after activities of ACD project.

The organization structure for Open Line and Project Wing is as below



### The Key Performance Areas (KPA) of Mechanical Department are following

- Locomotive Operation and Crew Management
- Coach Maintenance
- Freight Train Examination and Maintenance
- Maintenance and Operations of Track Machines
- Maintenance and Operations of Rescue Trains (ART and ARMVs)
- Management of ACD and ACWP Projects

The department is responsible for maintenance of coaches, wagons, track machines and to some extent locos. The Mechanical department also administers all the Loco Running staff. The summary of activities are given in location activity chart shown below

There are 396 Mechanical (C&W) staff and 351 Running staff on roll. Detailed staff position is given in **Annexure A**.

KPI report is in **Annexure- B**

Various types of Rolling stock maintained by the department is tabulated below.

RA	OBS CAR	FACC W	ACCW	ACCN	WCB	CN	SLR	SLRD	GS	GSRD	CZ	TOT
1	1	5	5	16	5	38	13	3	14	2	75	178
140T CRANE	BOBYN	CSM	UNIMAT	BCM	DTS	RMV	ART Coaches	ARMV Coaches	DEMU			
1	39	4	2	1	1	10	4	6	15			

Statistics for various types of activities for Mechanical department are listed in **Annexure C**

The work of Mechanical department like the rest of Konkan Railway is divided in two region i.e Ratnagiri and Karwar. Brief on the activities of Ratnagiri and Karwar are given below

#### A. RATNAGIRI REGION

**ORGANIZATION:** The Mechanical department of Ratnagiri region is managed by one Sr RME and one AME( Vacant).

#### **ACTIVITY CENTERS.**

**ROHA:-** Roha has a Running room of 53 beds. It is managed on contract. It is utilized by running staff of both Central Railway and KRCL. It caters to 66 staff per day.

**KOLAD:-** There is one Supervisor and 4 Artisans posted at Kolad who are assisting in operation of RO-RO.

**CHIPLUN:** At Chiplun, two Supervisors, 24 Artisans and 8 Khalasis are posted. There is an RCD(Fueling Installation ) consisting of two large storage tanks of 656KL each with a daily fuel issue of about 23 KL. The major activities of Chiplun are:-

- Fueling of all freight train locos, approximately 12 locos per day.
- Fueling of 12619/12620, 50104 and 11004 / 11003 & holiday special, passenger train locos, track machines and RMVs.
- Maintenance of 2 RMV's.
- Staff HQ of gang for CSM 954 track machine operation and maintenance.
- Freight train examination for loading at RN and for BPC extension when Verna is choked. Related wagon repair.
- Minor attention to any rolling stock (Carriage/wagon/loco) unusual enroute.

# Konkan Railway



ARABIAN SEA



Map not to Scale

- Important Stations
- Railway Track

**KOLAD**  
Lashing certification of Ro-Ro Rakes  
Other roadside attention to rolling stock

**CHIPLUN**  
Fuelling of locomotives  
Maintenance of RMV 5402,5403 & CSM 954  
Intensive Examination of BOST, BT BCN BOXN

**RATNAGIRI**  
Rolling in/out of mail and passenger trains  
Primary Maintenance of 50103/50104  
En route attention to wagons, coaches & locos  
Maintenance of ARMV & RMV-5409,5404&5405  
Running room and Crew Booking Point

**VERNA**  
Upkeep of 140 ton Crane, ART & ARMV  
Maintenance of 700/1400 HP DEMU  
Maintenance of WDS6 loco  
Maintenance of CSM 946/947, UNIMAT & BCM  
Intensive Examination of Goods & RO-RO Rakes and sick attention  
IOH and C-Schedule of Coaches  
Running room and crew booking point

**MADGAON**  
Rolling in/out examination  
Primary Maintenance of 10104/10111, 10112/10103 & 50108/50107, DEMU  
Secondary Maintenance of 12449 & 10215/10216  
Fuelling of mail/passenger trains  
Running room and crew booking point

**SURATHKAL**  
Lashing certification of RO-RO Rakes  
Rolling in/Rolling out of RORO rakes  
Attention to unusual of main line trains  
Running room

**HPCT**  
Intensive Examination of BTPGLN, BTPN/BTFLN  
BTPN & other stock  
Attention to Sick wagons  
Loadability check of POL wagons

### Location Activity Chart of Mechanical Department

**RATNAGIRI:-** There are 11 Supervisors, 29 Artisans and 15 Khalasis posted at Ratnagiri. There is a Coach Maintenance Pit line of 18 coach length along with a simple coach washing plant. There is a Carriage & Wagon Maintenance Shed. There is a small RCD with storage capacity of 70KL. For management of 116 Running staff there is a Crew Lobby. For Running staff to take rest there is a 48 beds Running room.

The major activities are:-

- a. Maintenance of 50104/ 50103 Dadar Ratnagiri Passenger rake
- b. Rolling In examination of through mail / express train and attention to any coaching unusual
- c. Maintenance of Six RMVs.
- d. Maintenance of Accident Relief Medical Van and restoration and re-railment work in the event of an accident.
- e. Fueling of goods train locos on need basis. (Kept in suspension as on date)
- f. Booking of 116 Running staff daily from Crew Lobby
- g. Providing Rest facilities to Running staff of Verna and Central Railway

### **B. KARWAR REGION.**

1.1 **ORGANIZATION:** - There is one Sr.RME who is incharge of the region and one SME for MAO and one AME each at Verna and Suratkal.

#### **1.2 ACTIVITY CENTERS.**

1.2.1 **THOKUR:-** At Thokur there is a small Wagon depot to service the HPCL siding. It carries out RBPC , intensive and safe to run examination of Petroleum wagons. It also services Ro-Ro loading/unloading at Suratkal. There are 5 Supervisors, 7 Master Craftmen 15 Technicians posted at Thokur.

1.2.2 **SURATKAL:-** At Suratkal there is a running room with 18 beds and presently 12 Running staff are using it daily.

1.2.3 **MADGAON:** Sr RME of Karwar region has his office at Coach care centre Madgaon.

a. Coaching Depot: There is one pit line of 24 coach length along with one Automatic Coach Washing Plant. There are 178 coaches based at this depot. This depot is manned by 14 Supervisors, 75 MCM/Artisans and 17 Khalasis. The activities are:

1. Primary maintenance of Mandovi / Konkan Kanya 10111/10112/ 10104/10103, and 50108/50107 rakes at the above pit line.
2. Secondary maintenance of Goa Sampark Kranti bi-weekly and MAO- ERS weekly and many other Winter/Summer/Holiday Specials. Rolling In of all

mail/express/passenger trains and any unusual / minor repairs at platform or Enroute.

- b. RCD: Madgaon has the largest RCD on KRCL which has storage facilities of 354 x 2 KL and daily issue of approx. 45 KL. All mail/express and all freight trains passing through Madgaon are fuelled at this RCD.
- c. Crew Lobby & Running room: 113 no. of mail/express/passenger crew are headquartered at Madgaon. There is 17 bed Running room to cater to mail/express Running staff of Ratnagiri region and S.W.Rly.

1.2.4 **VERNA:** This is major activity center for the Mechanical dept. It has Loco, Wagon & Coach Maintenance facilities. There are 16 Supervisors, 102 MCM/Artisans and 36 Khalasis headquartered at Verna. The major activities at Verna are:-

1. Maintenance of Accident Relief Train including 140T break down crane and restoration and re-railment work in the event of an accident.
2. Maintenance of Accident Relief Medical Van.
3. Maintenance of 3 sets of DEMU.
4. Intensive examination of all types of freight trains and repair to all types of Wagons.
5. Maintenance and operation of CSM-946, CSM-947, Unimat and BCM.
6. Maintenance of 4 nos. of RMVs.
7. Maintenance of all Mechanical dept M&P.
8. IOH of coaches.
9. Minor repair of locomotives.
10. There is a small Running room of 12 beds which is used by Running staff of Ratnagiri. There is a crew Lobby where 92 running staff are HQ.
11. There is an RCD having tank capacity of 330 x 2 KL. The daily issue is 24KL.

## Achievement Highlights

The recent achievements of the department are highlighted below

### **1. Rolling Stock Management**

#### **Roll On Roll Off (RORO) Service**

The RORO service being offered by Konkan Railway to the road transport Industry has been a fuel-efficient system which has provided benefit to the truckers in terms of saving on fuel, wear and tear as well as transit time while also helped in conserving fuel, reducing congestion on roads and helping to keep pollution under control.

At present total 6 rakes have been formed out of modified BRN and condemnable BOXN wagons. Total 177 condemnable wagons have been converted for use in RORO service so far.

The details of savings in fuel is given below

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Service Started . Year 1998-99

Total No of Trips Made in both UP and DN Directions = 12124

Total No of Trucks hauled in both UP and DN Directions = 409915

Calculations of Fuel Saving based on available data from 2005-06 to 2014-15 (upto Dec)

Total No of Trips made = 9038

Total No of Trucks Hauled = 339801

Total Fuel Saving (2005-06 to 2014-15) = 6,16,93,980 litres (Actual)

Extrapolation of total fuel saving from the start of service in year 1998-99

Fuel saving per truck hauled =  $61693980/339801 = 181.6$  litres

**Total Fuel saving (estimated) =  $181.6 * 409915 = 7,44,40,564$  litres**

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#### **Modification of Condemnable BOXN wagons for RORO Service**

In order to save on overall cost of transportation, the work of conversion of old condemnable rolling stock to the required design for use in RORO service was started. Three such rakes with total 177 BOXN wagons have been converted so far. With these efforts, total capacity has increased to 6 rakes.

In addition to this, strengthening of BRN wagons used for RORO service was undertaken at vulnerable locations like sole bar, flooring and flap doors has also improved the reliability of

the rakes significantly resulting in improved availability of rolling stock. The strengthening work was undertaken on 42 wagons so far.

### **Conversion and Refurbishing of Observation Car .**

One non-AC coach 94211/WGSCN/KRSWR was converted as observation car at Verna Depot depot with an approximate cost of Rs. 20 lakhs. This observation car was released for service from 01.01.2014. This coach has one inspection cabin with one bed room, kitchen, meeting room and two coupes. It is being utilized extensively for inspection by HODs and Konkan Railway.

### **Introduction of New 1400 HP DEMU Service**

A new 1400 HP DEMU car service was started between Mangalore Central (MAQ) and Bhatkal (BJTI) stations and has now been extended upto Madgaon Station. The training of both running and maintenance staff was organized in Golden Rock (GOC) shed and Southern Railways to handle this new technology rake with air suspension, EP brake and Schaku coupling. The regular monitoring of running staff has resulted in stabilization of this service. Some changes in coaches like modification of door handle of Power Car, modification in wiper system and wrapping of jumper cables have also been made to suit to specific operation and maintenance requirements.

### **Introduction of WDP4D and WDG4D Locos**

As a result of high speed trial conducted on Roha Madgaon route of Konkan Railway in 2003, a recommendation was made for introduction of both side cab WDP4 locomotive to ensure proper visibility and to exploit full speed potential in both directions. The conventional WDP4 loco was then modified to WDP4 B(modified cab) and further to WDP4 D with twin cab. These locomotives were put into the service on KRCL route for running trains between Mangalore (MAQ) to Madgaon (MAO) in the coastal area of Konkan Railway Section on 19<sup>th</sup> April 2013. The CRS sanction for running WDG4D locos on KRCL route has also been obtained. These locos are now running on KRCL route.

### **Introduction of Double Decker Train**



The premium AC Double Decker train with LHB type of coaches and Fiat bogies were introduced in Konkan Railway Territory from LTT to Karmali on 22/08/2014 as a special train. This train will run on regular basis in very short time. Necessary compliances for obtaining sanction from Commissioner of Railway Safety (CRS/CC) for running this train have been ensured

### **Introduction of New Track Machines**

The extensive use of equipment and machines for track maintenance has enabled Konkan Railway to ensure superior quality of track with very less manpower as compared to Indian Railways. This has been made possible by ensuring high standards of reliability and availability. The new machines which have been added to the fleet over recent years include one tamping machine (CSM 954), one Ballast Cleaning Machines (BCM), one UNIMAT and one Dynamic Track Stabilizer (DTS). New DTS and UNIMAT machines have been commissioned in the month of August 2014. The supervisors and artisans have been adequately trained at OEM premises, IRTMTC/Allahabad and at work sites.

The KRCL is also buying other important track machines like Ballast Regulating Machine (BRM) and Utility machines (UTVs).

### **Modification of SPURT for SPARMV with Both Side Dual Cabs**

The ARMVs stationed at Verna and Ratnagiri have been made by converting dual drive cabin special purpose ultrasonic test car (SPURT). This dual driver cabin car was required to be reversed for movement of SPARMV/VEN other direction consuming 30 minutes for this activity.

In order to enable ARMV to run from either direction with shunting, the coach at other end has been converted with provision of cabin and the SPARMV/VEN can be moved in both direction with self propulsion in stipulated time. This conversion work for ARMV Verna was completed in the month of June 2014.

### **Maintenance of Bio-Toilets**

Various initiatives have been taken in order to gear up for the maintenance of Bio Toilets in coaches. At present there are 18 coaches fitted with Bio-Toilets in KR trains. The initiative taken and action plan is highlighted below

1. Training of executives, supervisors and staff on maintenance of Bio-Toilets at CAMTECH Gwalior. In-house training has also been provided to staff.
2. Tie up with one government approved laboratory in Goa for carrying out prescribed chemical tests
3. Arrangement of consumables like enzymes and chlorine tablets
4. Arrangement of material and tools required for maintenance
5. Development of check sheets and work instructions for prescribed preventive maintenance schedules.

### **Train Operation**

#### **Commissioning of New Fueling Point (RCD) at Verna Depot**

The fueling point (RCD) at Verna depot was commissioned and fueling started from the month of April 2010. This RCD was started to meet the requirement fueling diesel locomotives utilized for running freight trains in both UP and DN direction. The issue of fuel from this RCD was 8000 liters per day in the beginning which has now increased to approximately 30000 liters per day.

#### **Commissioning of In Motion Weigh Bridges**

The 120 Tonne capacity Electronic Pit Less Rail In-motion Weigh bridges were commissioned at Verna and Ratnagiri stations in the months of January 2012 and December 2013 respectively. These weigh bridges are designed to be used for weighing of individual wagons of freight stock in a moving rake running at speed below 15 KMPH. The supply and erection work was executed through M/s Digital Weighing System (P) Ltd, Bilaspur at both locations. Both these weigh bridges are working satisfactorily.

#### **Improved Utilization of Coaching Stock**

The holding of coaches in Konkan Railway was reduced by 10 numbers from 169 to 159. This has resulted in improved efficiency of coaching stock management and also a saving of

Rs 100,54,655 per year on account of reduced hiring and maintenance expenditure

### **Initiatives to Improve Train Operation**

Various actions have been taken by the department to improve efficiency in train operations. Some of the important ones are listed below

Extended run of KRCL running staff in SWRly Jurisdiction - 21 sets of crew of VEN depot were given road learning for Madgaon (MAO) . Kolam (QLM) section beginning from the month of March 2014. This has helped clear freight trains from Konkan Railway territory to South Western Railway territory.

Similarly, 06 sets of crew of Suratkal depot were given road learning in Thokur. Subrhamanya Road (SWR) section from 30/08/2013. This has helped clear freight trains of petroleum products from HPCT siding to South Western Railway.

In order to improve operational efficiency and reduce instances of breach of working hours, a satellite headquarter for running staff was started at Suratkal in the month of February 2013.

3. Issue of Round trip BPC for LPG rakes with required infrastructural facilities was started at Thokur (TOK) yard from September 2012.

## **Training and Development**

### **Inhouse Refresher Course for Running Staff**

The start of refresher course for loco pilots at Konkan Railway Academy, Madgaon in the month of May 2013 was a pioneering effort made towards inhouse training of employees. The training of running staff in loco operations, troubleshooting and maintenance requires enormous efforts in terms of preparation of training material, organizing resources like instructors, arrangement of practical training on running locomotives and maintenance sheds and above that overcoming obstacles to meet requirements of such a critical course.

Total 18 batches of loco pilots have been trained since then covering 103 loco pilots and 107 assistant loco pilots. This programme has helped saving of Rs. 1.67 Crore for Konkan Railway so far in addition to ensuring better quality of training for its staff. The more important

aspect is that this training being recurring in nature will help a regular annual saving of Rs.1.25 Crore.

#### **In-house Initial Course for Assistant Loco Pilots**

The initial training for newly recruited Assistant Loco Pilots was started in Konkan Railway Academy (KRA) for the first time in the month of June 2014 with batch of 25 employees. This training was earlier imparted at Zonal Railway Training Institute (ZRTI), Bhusawal.

The syllabus and training modules issued by Railway Board are being followed. It is worth highlighting here that although Railway Board has prescribed 102 working days program for initial training of ALPs being followed in Zonal Railways, the training calendar of KRCL has been provided with additional 20 days, during which the trainees would visit at least two sheds to obtain advanced practical knowledge on both ALCO and HHP types of locomotives. In addition, special sessions have been planned for imparting in-depth knowledge in new technology areas like microprocessor systems and computer controlled brake systems for which experts from both Railways and OEMs are being invited.

#### **In-house Refresher Course for JE/SE/SSE (C & W)**

The in-house refresher course for JE/SE/SSEs (C & W) was started for the first time from 11.02.2013 at Konkan Railway Academy (KRA) Madgaon. Total 4 batches covering 32 supervisory staff have been provided refresher training till date. This initiative has made Konkan Railway self-reliant in organizing such mandatory courses as earlier the training was being provided at Zonal Railway Training Institute (ZRTI), Bhusawal.

#### **Training of Staff on New Technologies**

Imparting training to employees in new technology and practices has been the thrust area.

Adequate number of supervisors and technicians have been trained in maintenance and operation of track machines at IRTMTC/Allahabad and at M/s Plasser. These include CSM, UNIMAT, BCM and DTS.

13 supervisors and technicians were trained in maintenance of 1400HP/700HP DEMU maintenance at GOC shed and Southern Railway. In addition the loco pilots and loco inspectors were also trained in operation and troubleshooting of HHP DEMUs.

Adequate number of supervisors and staff have also been trained in maintenance of Bio-Toilets and LHB coaches.

Total 1800 mandays of training was imparted to C&W staff on different subjects at various places and 193 mandays of training was given to running staff other than mandatory courses. In addition to the training has also been given in diverse fields like derailment investigation, disaster management and rescue operations taking help from Railway units and organizations like Civil Defence Organization.

### **Improving Work Environment**

#### **Improvements in Infrastructure and Amenities in Running Room**

Various efforts have been taken for improvement in amenities to be provided to running staff during out station rest in running rooms in past few years. These include improvements in facilities provided in rooms, kitchen and dining area, toilets and bathrooms and reception area. The additional facilities for recreation, reading and meditation have also been provided and separate areas have been allocated for each. Provision of other amenities for daily use like electric Iron with table, shoe polish kit, mosquito repellent have also been made in all running rooms.

#### **New Running Rooms at Suratkal and Madgaon**

The construction of two new running rooms at Suratkal and Madgaon respectively have been the big steps taken to improve the quality of outstation rest for running staff of Konkan Railway and other adjoining Railways.

The running room at Suratkal was commissioned in the month of February 2010. This is a 12 bed running room used by running staff headquartered at Verna and Madgaon.

The new running room at Madgaon was commissioned and started for use on 26.01.2014. This is 17 bed running room used by running staff of Konkan Railway and South Western Railway.

### **Provision of Air Conditioning in Running Rooms**

Konkan Railway is one of the few Railways which have made provision of air conditioning of running rooms. This work was started with newly constructed running room at Madgaon. Each of seven rooms has been provided with 1.5 Ton capacity split AC. The dining hall and is provided with 2 Ton capacity AC. The provision of air conditioning was commissioned on 15<sup>th</sup> August 2014.

The newly constructed building of Suratkal running room has now been taken up in second phase for provision of air conditioning. The work for this has already been sanctioned. The air conditioning of other running rooms at Roha, Ratnagiri and Verna has also been planned.

### **Improving Environment**

Various initiatives have been taken to improve environment, some of which are highlighted below

An Incinerator was commissioned at Coach Care Centre, Madgaon on 14.12.2011 for disposal of dry waste. This is being used on regular basis.

An Effluent Treatment Plant of 50000 liter capacity was also commissioned at Coach Care Centre, Madgaon on 31.01.11. This plant helps recycle the water used for cleaning of coaches and has reduced the water consumption for coach cleaning significantly. In addition it also helps ensuring that only treated water is discharged from the depot to civil sewage line.

The garbage and wet waste generated in coaching depot is also collected and disposed off to sites nominated by government of Goa.

### **Mechanical Projects**

#### **Retro fitment of Anti Collision Device (ACD) in Locomotives**

The work of retrofitment of ACD equipment in 82 locomotives was completed in order to ensure maximum utilization of locomotives fitted with ACD equipment and to improve the ACD coverage over North Frontier Railway. The ACD equipments from locomotives of MugalSarai, Samastipur, Tungalabad, Itarsi, Gonda and Patratu loco sheds were dismantled as usage of locomotives from these loco sheds on NFR territory was found to be very less as compared Eastern & North Frontier Railway based locomotives.

These dismantled ACD equipments were fitted in locos of Howrah, Burdwan, Andal, Malda Town and New Guwahati Loco sheds. This initiative significantly improved the ACD coverage on NFR territory while at the same time the maintenance cost has also been reduced.

The retro fitment work was successfully completed during the period of October 2012 to May 2013.

#### **Development of ACD Braking Unit for EMD locomotives**

Konkan Railway has installed Anti collision devices (ACD) on more than 500 conventional ALCO design locomotives based in Eastern Railway and North Frontier Railway (NFRly). However with introduction of EMD/HHP locomotives in Indian Railways, the population of which has increased significantly over the years, an ACD interface for EMD locomotives was also developed with the help of following OEMs

M/s Knorr Bhremse India Ltd. (KBIL) for Braking Interface Card

M/s Kernex (KMIL) for Braking Interface Unit and

M/s Elixir, Bangalore for Speedometer Interface Card

Two WDG4 Locomotives based at Siliguri shed were fitted with these braking units and other ACD accessories on 18.01.2013 on trial, which was completed successfully. The performance of these units is being monitored

#### **Upgradation of Loco ACDs to Version 1.1.2/1.1.2m**

The upgraded Anti collision device (ACD) Version 1.1.2/1.1.2m was introduced for ACD system in North Frontier Railway. As part of this exercise all locomotives fitted with ACD equipment were also upgraded to version 1.1.2/1.1.2m. The joint evaluation of performance parameters of Anti collision device (ACD) Version 1.1.2/1.1.2m was carried out in Tinsukia Division by RDSO,N.F.Rly and Konkan Railway from 16.09.2013 to 25.09.2013.

15 loco ACD parameters were checked during trials. The trials were declared successful by RDSO and North Frontier Railway also acknowledged the improvement in performance. Furthermore, modifications in braking logic resulted in braking through ACD resembling very closely with that done by loco pilot, which is a very significant achievement.

#### **New Automatic Coach Washing Plant of KRCL Design**

A new design of Automatic Coach Washing Plant was developed and has been successfully commissioned at the Coach Care Centre Madgaon in the month of November 2012 and the same is working satisfactorily.

Konkan Railway can set up similar plants at various coach maintenance depots of Indian Railways at an approximate basic cost of Rs 1.25 crore each against imported Coach Washing Plants, which cost in the range of Rs 6-7 crores. Effluent Treatment Plant and Water Softening Plant are also provided at an additional cost on demand.

A project of design, fabrication, installation, testing and commissioning of Automatic Coach Washing Plant on turnkey basis has also been successfully completed for Dum-Dum (Noapara) car shed of Metro Railway, Kolkata in the month of March 2013.

Efforts have been made to explore further reduction in overall cost and different workable options to make this product more competitive and valuable. As a result, two designs of coach washing plants have been developed with feasibility of approximately 20% reduction in overall cost.

KRCL has also developed a 'Build Own Operate (BOO)' model for offering this service to the Railways.

There are approximately total 60 coaching depots on Indian Railways where Automatic Coach Washing Plants can be provided as an alternative to manual cleaning. Out of which 43 depots have been surveyed by Konkan Railway where KRCL designed plants can be installed. The KRCL design provides a cost competitive alternative to imported plants.

### **Development of Indigenous Automated Train Examination System**

An in-house way side inspection named Automated Train Examination System (ATES) is being developed on trial at Ratnagiri station. This system is proposed to have following features

1. Hot Box Detector for hot axle
2. Hot Wheel Detector for brake binding
3. High Speed Camera based Visual Examination

The results of initial trials were found satisfactory. This system is expected to provide a cost effective solution to the human intensive examination system as compared to the imported systems.