



Mechanical Department : Past, Present and Future

The vision of connecting Maharashtra in the North to Kerala in the South along the West coast of India through a rail network to shorten travel time led to the formation of Konkan Railway Corporation Limited (KRCL) as a Government of India undertaking. The task to construct a 760 Kilometer long Broad Gauge line along the coast and through the rocky terrain of Western ghats was a unique challenge Indian engineers had to face in Independent India as this involved building large number of long tunnels and bridges.

The Genesis: Conventionally, Mechanical Department of any Railway would have core performance areas like planning, manufacturing and maintenance of rolling stock, train operation activities like safety examinations of rolling stock, crew management, fueling, passenger amenities as well as disaster management. But, the train operation had to wait for some years till the tracks are laid and line is opened for traffic. Therefore, in addition to planning, designing, and constructing assets required for the acquisition and operation of locomotives, coaches, wagons, the department was also assigned the task to handle operation and maintenance of special purpose construction equipment like excavators, road vehicles, imported tunneling machinery and gas pressure welding equipment.

Konkan Railway has 92 tunnels totaling a route length of 88 Kilometers. Many of them are more than 2 kilometers long. Realizing the challenge this mammoth construction project would pose, it was decided to import nine sets of drilling jumbos and loaders from Sweden. The contractor who supplied these Boomers/Loaders did not come forward to commission the equipment and this came a real big hurdle to the project. At that moment, Mechanical Department took the initiative and commissioned the Boomer/Loader to ensure that the project is not delayed. Encouraged by this successful endeavor, the department also stood to the challenge of not only operating and maintaining these machines departmentally, but also developing indigenous sources for spare parts.

KRCL had adopted Gas Pressure Welding method for welding of rails, which is a very critical activity in track laying. Initially the equipment were imported from China. But, this technology was highly labour intensive and required specialized skills. To avoid this problem, Japanese method of Gas Pressure Welding was adopted later and 18 such plants were imported. Again, Mechanical Department not only took the lead to handle these equipment, but in the process also developed many more similar indigenous welding plants. These equipments were maintained and operated departmentally with high level of satisfaction.

Unlike age old peers in Indian Railways, the department learned to be creative and flexible in its approach right from the beginning and this became its core competence. The story continued with development of first prototype 'Gang Lorries' through M/s OVIS Equipment Pvt. Ltd., Hyderabad. These are self propelled 4 wheeler rail vehicles used for transportation of men and materials for

maintenance of track. Ten such vehicles are now maintained by the department. Later the department also took over the operation and maintenance of track machines. Three Tie Tamping machines procured from M/s Plasser in the beginning were maintained and operated by Mechanical Department. Currently, the department operates and maintains 7 different types of track maintenance machines while two more are expected to be inducted shortly.

The Evolution: The running of goods and passenger services required infrastructure and resources for maintenance of locomotives, coaches and freight stock. For this, necessary infrastructure was created at Ratnagiri, Madgaon, Verna and Chiplun. A Diesel Rolling Stock Depot was commissioned at Verna for maintenance of locomotives and Diesel Electric Multiple Units (DEMU). The passenger train maintenance facilities were created at Madgaon and Ratnagiri. With induction of additional passenger services, one additional pit was constructed recently at Madgaon Coaching depot while one Intermediate Overhaul (IOH) shed is also likely to be commissioned by the end of 2015. The depot has also equipped itself to maintain advanced technology stocks like LHB coaches and Bio-toilets.

There were only two DEMU rakes of 700 HP capacity in the beginning but now three more 1400 HP and 1600 HP rakes have been added to run a passenger service between Madgaon and Mangalore and between Karwar and Pernem. With this, Verna depot is expected to grow as a major hub for DEMU services.

The freight train examination and maintenance facilities were developed at Verna and later wagon examination and repair depot was also created at Thokur for maintenance of Petroleum and LPG rakes for HPCL. Today, this depot is maintaining dedicated service of closed circuit rakes of POL and LPG for HPCL. Later on additional facilities for wagon maintenance were also created at Chiplun to cater to the requirement of loading of limestone at Ratnagiri. The fueling points were also commissioned through M/s Indian Oil at Madgaon, Verna, Rantagiri and Chiplun and now approximately 40,000 KL of fuel is issued every year.

With Passenger and Mail/Express trains being diverted on Konkan Railway route after opening of the Railway, there was a sudden spurt in requirement of crew for which limited number of crew available with KRCL was barely sufficient. Therefore, Zonal Railways were requested for sending staff on deputation. However, owing to poor response, retired loco inspectors and crew were recruited as consultants and the traffic was handled efficiently. Today, the department has approximately 400 running staff who have been trained to run all types of advanced technology locomotives. In the beginning, the training of these staff was being arranged at Zonal Training Center, Bhusaval, but now all types of training including refresher and promotional courses is being organized inhouse at Konkan Railway Academy (KRA), Madgaon.

The department is also responsible for rescue operations in case of train accidents. One accident relief train with 140T Breakdown Crane is stabled at Verna for this purpose. In addition, two ARMVs are stationed at Ratnagiri and Verna.

One of the pioneering initiatives taken in freight transportation, which received nationwide appreciation, was Roll-on Roll-off (RORO) service. This was introduced on Konkan Railway for the first time in January 1999 between Suratkal and Kolad stations utilizing military/DBKM wagons. In this service road trucks are loaded and transported on flat wagons. Later, BRN wagons were utilized after suitable modification by the department to operate this service. As a step further, to save overall cost of transportation and also to carry more trucks per train, the work of conversion

of old BOXN stock for use in RORO service was started. Three such rakes with total 177 BOXN wagons have been converted so far. With these efforts, KRCL has created a capacity 6 RORO rakes. One more rake is planned to be converted in 2019-20 to support new service launched between Suratkal (KRCL) and Karembeli (Western Railway).

Introduction of RO-RO service has been a WIN-WIN situation for Railway, road transporters as well as the nation. The minimum terminal detention and loaded traffic in both directions, has resulted in better financial returns for Railway.

Creating Value and New Business Streams: In addition to operating a full-fledged Railway system, Konkan Railway has also been involved in various technology based projects, with a view to upgrade maintenance and operations on the Railway, while also improving safety standards.

One such project is Anti Collision Device (ACD) or Raksha Kavach. This is a self-acting microprocessor based communication equipment developed by Konkan Railway. When installed on Locomotives, brake vans, SLRs, stations and manned/unmanned level crossing gates, the system prevents high speed collisions in mid-section, station area and at level crossing gates, thereby ensures saving of valuable lives. The final action of braking takes place through Auto Braking Unit (ABU), which was developed by Mechanical Department. The system is totally indigenous and has been commissioned on NF Railway successfully. Work of installation of ABUs on locomotives of different sheds was also done departmentally from within the existing resources of the Mechanical Department of Konkan Railway. Later, the ABU technology was also developed for new design HHP locomotives with successful trials in North F Railway.

Another feather in the cap of department is **Automatic Coach Washing Plant.** This was conceived and developed inhouse and installed at the Madgoan and Ratnagiri coaching depots. Based on experience gained from this project, a new design of 'Automatic Coach Washing Plant' was developed and successfully commissioned at Coach Care Centre, Madgaon in 2012 and Kolkata Metro in 2013. This design is highly cost effective as compared to the imported ones and also has environment compliant facilities like effluent treatment plant and water recycling plant. In order to enhance the value offer to the customer, the cost has been reduced further by almost 20% and different product models have now been developed. The plant is also being offered on Build Own Operate (BOO) Model.

A project on installation of '**Automated Train Examination System (ATES)**' is underway at Ratnagiri. This system based on infrared sensors and high speed cameras will automate the rolling in examination of trains and is also expected to improve safety and reliability. It is planned to take this project further to provide a low cost indigenous alternative to the imported technologies. Today. We already have Five Installations of ATES in KRCL, Central Railway and Western Railway.

The department has also taken a big step to make inroads in rolling stock infrastructure development and O&M projects. It has undertaken a project of **construction of Rolling Stock Component Factory at Chiplun for Indian Railways** with project value of Rs 410 crore. The department is also taking several efforts in **Rolling Stock O&M business in India and Overseas.**

The Road Ahead: The department has always believed in the strength of its people and this has created a pool of competent and multiskilled workforce eager to manage any assignment. The people of this department have been trained in cross discipline multiple skills for all types of rolling

stock and track machines. They are also being equipped to operate and maintain new technologies in rolling stock. Trouble free induction of HHP DEMUs, new age microprocessor based locomotives, LHB coaches, Bio toilets and latest technology track machines can vouch for this.

With flexibility and innovation as its core and a skilled and dedicated workforce as its pillars, the department aims to carry forward its legacy to become a learning enterprise in true sense. Mechanical department of Konkan Railway, working on the principals of continual improvement is ready to take up challenges of the future in terms of both workload and technology with following key objectives

1. Bringing in value added services with cost efficiencies adopting lean management practices
2. Continuously improving availability, reliability and safety standards in Rolling Stock and Track Machine Management
3. Building human resource capabilities through training, development and empowerment
4. Enabling vendors and business partners to make them capable value chain partners
5. Developing and adapting product, process and information technologies for seamless transformation for Industry 4.0
6. Making extensive efforts towards business development and timely execution of projects