

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

RAJYA SABHA
UNSTARRED QUESTION NO.1242
ANSWERED ON 16.12.2022

TECHNOLOGY DEVELOPMENT FOR MODERNISATION OF RAILWAYS

1242. SHRI HARNATH SINGH YADAV:
SHRI VIJAY PAL SINGH TOMAR:

Will the Minister of RAILWAYS be pleased to state:

- (a) whether Railways is working on technology improvement/development for modernization of Railways;
- (b) if so, the details thereof;
- (c) whether Railways is making a policy to enable involvement of private sector for research and development in Railways; and
- (d) if so, the details thereof?

ANSWER

MINISTER OF RAILWAYS, COMMUNICATIONS AND
ELECTRONICS & INFORMATION TECHNOLOGY

(SHRI ASHWINI VAISHNAW)

(a) & (b): Yes, Sir. Technology improvement/development for modernization of Indian Railways is a continuous process. The various steps taken by Indian Railways in this regard are as under:

(1) Track: (i) The maintenance of Tracks on Indian Railways has been revolutionized by the introduction of mechanized track maintenance using technologically advanced machines like High Output Tamping & Stabilizing Machines (HOTS-3X), etc. The machines have enabled Indian Railways to increase the output of track maintenance manifold as compared to manual track maintenance.

(ii) The inspection of tracks has also been modernized by using technologically advanced Track Recording Car which is faster and more reliable. It has additional feature of video recording of track components.

(iii) The life of rails has been enhanced with the introduction of Rail Grinding Machines. The newly procured 10 nos. high output rail grinders and 10 nos. speciality grinders are under introduction for fast and complete rail grinding.

(iv) Modern track structure consisting of pre-stressed Concrete Sleeper (PSC) Normal/Wide base sleepers with elastic fastening, 60 kg, 90 or higher Ultimate Tensile Strength (UTS) rails, fan shaped layout turnout on PSC sleepers, Steel Channel Sleepers on girder bridges is used while carrying out primary track renewals.

(v) Long rail panels of 260 M/130M length are being manufactured at the steel plant to minimize number of Alumino Thermit Joints in the track.

(vi) Provision of Thick Web Switches (TWS),

(vii) Weldable Cast Manganese Steel (CMS) crossings, (v) Using of improved fittings,

(viii) Ultrasonic testing of rails to detect flaws, etc.

(2) Bridge: (i) Bridge Management System (BMS), a web based IT application has been developed to facilitate 24x7 availability of information such as bridge drawings/design details, inspection details, photographs, videos, etc. for meaningful analysis, assessment of progressive deterioration and capacity to carry increased loads.

(ii) New and Modern Technologies introduced to upgrade inspection techniques of Bridges such as continuous water level measurement and monitoring system; inspection of bridges using Drones, 3D scanning of riverbeds.

(iii) Railway has installed Continuous Water Level Monitoring System at 305 number of Bridges. This system provides SMS alert to railway official on every day(evening/morning)

(3) Rolling Stock: (i) Advanced/improved technologies like Online Monitoring of Rolling Stock System (OMRS) and Wheel Impact Load Detector (WILD) have been adopted for predictive maintenance of rolling stock. Presently, 25 OMRS systems and 20 WILD systems have been installed and are operational over IR's network.

(ii) Radio Frequency Identification (RFID) tags are being fitted on rolling stock to automatically track and trace the rolling asset moving over Indian Railways network.

(iii) In addition, other technological systems like Global Positioning System (GPS) in wagons, Hot Box Detector (HBD) and Machine Vision Inspection System (MVIS) are also under development for implementation over Indian Railways.

(4) EMU/MEMU: (i) Conversion of End-on-Generation (EOG) trains into Head-on-Generation (HOG) trains to reduce noise and air pollution at stations and in trains. It is also expected to significantly reduce the diesel used in power cars.

(ii) Introduction of IGBT based three phase technology in EMUs/MEMUs, Kolkata Metro and Vande Bharat Trains. Vande Bharat Express has modern features such as automatic doors with retractable footsteps, on board wi-fi and infotainment, GPS based Passenger Information System, roller blinds and diffused LED lighting.

iii) EMU/MEMUs, Kolkata Metro and Vande Bharat Trains rakes are manufactured with stainless steel car body. This will enhance the codal life of coaches.

(iv) With a view to increase passenger carrying capacity in EMUs, air conditioned EMUs with underslung electrics have been introduced.

(v) Installation of GPS based Passenger Announcement cum Passenger Information System (PAPIS) in EMU & Kolkata Metro. This Passenger Information System informs the passengers regarding the next approaching station through audio announcement on speakers as well as through video display on LED

screens simultaneously. Further, newly manufactured EMU/DEMU rakes are already equipped with such technology/system.

(vi) Air conditioned EMU services have been introduced on Western Railway and Central Railway. CCTV Cameras, Emergency Talk Button have been installed in EMU Trains.

(vii) With a view to further fortify the security system, in addition to CCTV Cameras and Emergency Talk Back System, Flasher lights have also been provided in ladies coaches and EMU rakes in some Zonal Railways. When the alarm chain of the coach will be pulled, these lights will start blinking and buzzer will start sounding till resetting of alarm chain.

(viii) LED lights have been provided for better illumination in the coaches.

(ix) Cushioned seats with stainless steel frame in First Class and polycarbonate seats with stainless steel frames in Second Class in newly manufactured EMU coaches.

(x) Upgraded scale of number of mobile charging points in General, Sleeper and Air Conditioned coaches.

(5) Locomotive: (i) Indian Railways has switched over to manufacture only new generation, high horse power, energy efficient IGBT based three phase electric locomotive from 2016-17.

(ii) WAP-7 & WAP-5 electric coaching locos are capable of hauling trains at 140 kmph & 160 kmph respectively. These locos are being used to haul long distance high speed trains over IR.

(iii) Railways has introduced high horse power 12000 HP freight locomotive with state of the art technology since 2020.

(6) Signalling System: (i) Electronic Interlocking (EI) are being adopted on a large scale to derive benefits of digital technologies in train operation and to enhance safety. So far 2811 stations have been provided with Electronic Interlocking upto 31.10.2022.

(ii) In order to increase line capacity to run more trains on existing High Density Routes of Indian Railways, Automatic Block Signalling is being provided.

(iii) Automatic Train Protection (ATP) System called Kavach, indigenously developed by Indian Railways, has been adopted as the National train protection system on IR. So far, Kavach has been deployed for 1455 Rkms on South Central Railway with 77 nos. of locomotives.

(7) Station Development: Ministry of Railways has undertaken scheme of 'Major Upgradation' of Railway Station over Indian Railways. The developed stations will have elements of state-of-the-art technologies such as intelligent building, green building, efficient energy/water conservation, superior waste management etc. amongst others.

(c) & (d): In order to develop a long-term framework for research collaboration, Indian Railways (IR) is making efforts to leverage the expertise available in various academic institutions, national & international organizations, including private sector. A startup innovation policy has also been launched by Ministry of Railways to develop cost-effective, implementable, scalable solutions, functional prototypes and innovative products for addressing Quality, Reliability and Maintainability related issues of IR and improving the same through specified usage of the developed products and innovative solutions

by IR. This policy will leverage innovative technologies, developed by entrepreneurs and Startups, for improving operational efficiency and safety on IR. This will also enable Railways to acquire domain knowledge and sharing information on latest research and development activities in Railway domain.

Also, Revised New Wagon Design Policy has been recently issued to expedite introduction of new wagon designs from private sector incorporating latest technological advancements on Indian Railways to cater to the emerging need of more efficient & cost effective transportation of existing commodities and expansion of the commodity basket.
