INTRODUCTION TO INDIAN RAILWAY

Phase I – Module No. FC-01
First railway was built between Mumbai and Thane in 1852 and

First passenger train ran between the two stations Boribunder and Thane, covering a distance of 34 km, on April 16, 1853.
About 40 per cent of the railway lines were in the newly created Pakistan. Many lines had to be rerouted through Indian Territory and new lines had to be constructed to connect important cities such as Jammu.

A total of 42 separate railway systems, including 32 lines owned by the former Indian princely states existed at the time of independence spanning a total of 55,000 km. These were amalgamated into the Indian Railways.
In 1952, it was decided to replace the existing rail networks by zones.

A total of six zones came into being in 1952.

On 6 September 2003 six further zones were made from existing zones for administration purpose and one more zone added in 2006.

The Indian Railways now has 17 zonal Railways.
<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Name of Zone</th>
<th>Head Quarter</th>
<th>No. of Divisions</th>
<th>Route Kms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Central Railway</td>
<td>Mumbai (CSTM)</td>
<td>5</td>
<td>3,905</td>
</tr>
<tr>
<td>2</td>
<td>East Central Railway</td>
<td>Hajipur</td>
<td>5</td>
<td>3,656</td>
</tr>
<tr>
<td>3</td>
<td>East Coast Railway</td>
<td>Bhubaneswar</td>
<td>3</td>
<td>2,676</td>
</tr>
<tr>
<td>4</td>
<td>Eastern Railway</td>
<td>Kolkata</td>
<td>4</td>
<td>2,447</td>
</tr>
<tr>
<td>5</td>
<td>Metro Railway</td>
<td>Kolkata</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>6</td>
<td>North Central Railway</td>
<td>Allahabad</td>
<td>3</td>
<td>3,151</td>
</tr>
<tr>
<td>7</td>
<td>North Eastern Railway</td>
<td>Gorakhpur</td>
<td>3</td>
<td>3,767</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Name of Zone</td>
<td>Head Quarter</td>
<td>No. of Divisions</td>
<td>Route Kms.</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------</td>
<td>--------------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td>8</td>
<td>North East Frontier Railway</td>
<td>Guwahati</td>
<td>5</td>
<td>3,965</td>
</tr>
<tr>
<td>9</td>
<td>North Western Railway</td>
<td>Jaipur</td>
<td>4</td>
<td>5,502</td>
</tr>
<tr>
<td>10</td>
<td>Northern Railway</td>
<td>New Delhi</td>
<td>5</td>
<td>6,990</td>
</tr>
<tr>
<td>11</td>
<td>South Central Railway</td>
<td>Secunderabad</td>
<td>6</td>
<td>5,810</td>
</tr>
<tr>
<td>12</td>
<td>South East Central Railway</td>
<td>Bilasipur</td>
<td>3</td>
<td>2,455</td>
</tr>
<tr>
<td>13</td>
<td>South Eastern Railway</td>
<td>Kolkata</td>
<td>3</td>
<td>2,661</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Name of Zone</td>
<td>Head Quarter</td>
<td>No. of Divisions</td>
<td>Route Kms.</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------</td>
<td>--------------</td>
<td>------------------</td>
<td>------------</td>
</tr>
<tr>
<td>14</td>
<td>South Western Railway</td>
<td>Hubli</td>
<td>3</td>
<td>3,191</td>
</tr>
<tr>
<td>15</td>
<td>Southern Railway</td>
<td>Channai</td>
<td>6</td>
<td>4,994</td>
</tr>
<tr>
<td>16</td>
<td>West Central Railway</td>
<td>Jabalpur</td>
<td>3</td>
<td>2,965</td>
</tr>
<tr>
<td>17</td>
<td>Western Railway</td>
<td>Mumbai (Churchgate)</td>
<td>6</td>
<td>6,440</td>
</tr>
</tbody>
</table>
Locomotives and rolling stock are two main components of the train.

IR has been procuring goods wagons from the market however coaches and locomotives both Diesel and electrical are manufactured by IR with its production units.

Later IR has taken over certain wagon manufacturing units also.
At present following production units are taking care of needs of IR for locomotives and rolling stock.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Name of Production Unit</th>
<th>Located at</th>
<th>Main Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chittaranjan Loco Works</td>
<td>Chittaranjan (W.B.)</td>
<td>Electric Loco</td>
</tr>
<tr>
<td>2</td>
<td>Diesel Locomotive Works</td>
<td>Varanasi</td>
<td>Diesel Locos</td>
</tr>
<tr>
<td>3</td>
<td>Integral Coach Factory</td>
<td>Perambur</td>
<td>Coaches</td>
</tr>
<tr>
<td>4</td>
<td>Rail Coach Factory</td>
<td>Kapurthala</td>
<td>Coaches</td>
</tr>
<tr>
<td>Sr. No</td>
<td>Name of Production Unit</td>
<td>Located at</td>
<td>Main Production</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------</td>
<td>-------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>5</td>
<td>Rail Wheel Factory</td>
<td>Bangaluru</td>
<td>Wheel &amp; Axles</td>
</tr>
<tr>
<td>6</td>
<td>Diesel Loco Modernisation Works</td>
<td>Patiala</td>
<td>Diesel Loco Components</td>
</tr>
<tr>
<td>7</td>
<td>Rail Coach Factory</td>
<td>Raibareli</td>
<td>Coaches</td>
</tr>
</tbody>
</table>
IR has been a government Department carrying out transport needs of country.

So transportation of passengers and goods has been core activity of IR and to facilitate this core activity and to support other supplementary activities.

PSUs/Undertakings have been formed which are with the Ministry of Railways.
**Different supporting activities of Indian railway.**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of PSU</th>
<th>Established in year</th>
<th>Main Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RITES</td>
<td>1974</td>
<td>Technical &amp; consultancy services</td>
</tr>
<tr>
<td>2</td>
<td>IRCON</td>
<td>1976</td>
<td>Construction activities in India &amp; abroad</td>
</tr>
<tr>
<td>3</td>
<td>CRIS</td>
<td>1986</td>
<td>Consultancy &amp; IT services to IR</td>
</tr>
<tr>
<td>4</td>
<td>IRFC</td>
<td>1986</td>
<td>To raise fund from the market to part finance the plan outlay</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Name of PSU</td>
<td>Established in year</td>
<td>Main Activity</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>5</td>
<td>CONCOR</td>
<td>1988</td>
<td>Multimodal logistic support to containerized domestic &amp; Exim cargo.</td>
</tr>
<tr>
<td>6</td>
<td>KRCL (Railtel)</td>
<td>1990</td>
<td>Construct and operate Railway lines, Construct ROB &amp; rail line projects</td>
</tr>
<tr>
<td>7</td>
<td>RCIL (Railtel)</td>
<td>2000</td>
<td>To built nationwide OFC based broadband telecom &amp; multimedia network</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Name of PSU</td>
<td>Established in year</td>
<td>Main Activity</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>---------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>8</td>
<td>IRCTC</td>
<td>2001</td>
<td>To undertake catering and tourism activities on IR also facilitate internet ticketing through web.</td>
</tr>
<tr>
<td>9</td>
<td>PRCL</td>
<td>2001</td>
<td>To execute SUNR-Pipavav port gauge conversion and new line project</td>
</tr>
<tr>
<td>10</td>
<td>RVNL</td>
<td>2003</td>
<td>Cerate and augment capacity of rail infrastructure</td>
</tr>
<tr>
<td>11</td>
<td>RLDA</td>
<td>2005</td>
<td>To develop vacant railway land for commercial use</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Name of PSU</td>
<td>Established in year</td>
<td>Main Activity</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>---------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>12</td>
<td>DFCCIL</td>
<td>2006</td>
<td>Plan &amp; Construct Dedicated freight corridors</td>
</tr>
<tr>
<td>13</td>
<td>MRVC</td>
<td>1999</td>
<td>To plan &amp; implement rail projects in Mumbai</td>
</tr>
<tr>
<td>14</td>
<td>BWEL</td>
<td>1978/2008*</td>
<td>To manufacture wagons &amp; structural fabrication jobs</td>
</tr>
<tr>
<td>15</td>
<td>BSCL</td>
<td>1976/2010*</td>
<td>To manufacture Railway rolling stock</td>
</tr>
<tr>
<td>16</td>
<td>BCL</td>
<td>1976/2010*</td>
<td>To manufacture wagons, retrofitting of EOT cranes</td>
</tr>
</tbody>
</table>

*-year of taken over by Ministry of Railways
➢ Research and development is very important part of any organization.

➢ on Indian Railways Research and development is carried out by Research Design and Standards Organization (RDSO) which is located at Lucknow.

➢ RDSO is also mandated to test and certify new technologies or innovations in train operation.
This centre is one of the directorate of RDSO is engaged in standardizing and preparing maintenance handbooks, pamphlets, reports, videos etc. on various subjects related to Railway Engineering for improving maintenance activities and efficiency.
HR development is another important aspect of the organization.

On IR for development of its manpower training institutes are provided all across the country.

Zonal training centers are located in zones for training of Group C staff.
For training of officers on IR, six premier training institutes have been established.

<table>
<thead>
<tr>
<th>SN</th>
<th>Name of Institute</th>
<th>Located at</th>
<th>For officers of</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>National Academy of Indian Railways (NAIR)</td>
<td>Vadodara</td>
<td>All Indian Railway Officers &amp; centralized training of officers of Accounts, Personnel, Stores and Medical services.</td>
</tr>
<tr>
<td>2</td>
<td>Indian Railway Institute of Civil Engineering (IRICEN)</td>
<td>Pune</td>
<td>Engineering Officers</td>
</tr>
<tr>
<td>3</td>
<td>Indian Railway Institute of Electrical Engineering (IRIEEN)</td>
<td>Nasik</td>
<td>Electrical Officers</td>
</tr>
<tr>
<td>SN</td>
<td>Name of Institute</td>
<td>Located at</td>
<td>For officers of</td>
</tr>
<tr>
<td>----</td>
<td>-------------------------------------------------------</td>
<td>------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>4</td>
<td>Indian Railway Institute of Mechanical &amp; Electrical Engineering (IRIMEE)</td>
<td>Jamalpur</td>
<td>Mechanical Officers</td>
</tr>
<tr>
<td>5</td>
<td>Indian Railway Institute of Signal &amp; Telecommunication (IRISET)</td>
<td>Secunderabad</td>
<td>Signal &amp; Telecommunication officers</td>
</tr>
<tr>
<td>6</td>
<td>Indian Railway Institute of Transport Management (IRITM)</td>
<td>Lucknow</td>
<td>For Traffic Officers</td>
</tr>
</tbody>
</table>
SALIENT FEATURES OF INDIAN RAILWAYS
Indian Railways is the fourth largest Railway network in the world after US, Russia and China.

It runs about 20,000 trains carrying more than 2.5 crores passengers and 2.8 million tonnes of freight every day.

In terms of passenger kms IR tops the list, with 1046 billion pkm.

Indian Railways has become the fourth railway in the world which loads more than a billion tonnes of freight in a year.
More than 12000 passenger trains which run across the country every day, cover a distance which is more than 4 times the distance between earth and moon.

Chhatrapati Shivaji Terminus, Mumbai has been given status of world heritage site by UNESCO in 2004.

Three Mountain Railways of India i.e. Darjeeling Himalayan Railway a narrow gauge railways in West Bengal, Nilgiri Mountain Railway, a metre gauge railway in the Nilgiri Hills in Tamil Nadu and Kalka- Shimla Railway, a narrow gauge railway in the Shivalik mountains in Himachal Pradesh are already declared UNESCO world heritage sites in 1999.
Facts and figures are the best indicators to understand any organization. IR has been improving its output every year in both passenger and freight transportation. Following key statistics about IR will help you understand about IR, its assets, its performance and financial status.
जो कार्य तुम आज कर सकते हो उसे कल पर कदापि मत छोड़ो।
ORGANISATIONAL SETUP OF INDIAN RAILWAY

Phase I – Module No. FC-01
Director/ Joint Director assist the Adv and EDs.
Chain of Command – Zonal HQ

General Member

CEE

CESE

Dy.CEE

CEE

CELE

Dy.CEE

CEE

CEDE

Dy.CEE

CEE

CEE(C)

Dy.CEE
Chain of Command – Division

DRM

ADRM

Sr.DEE/P

Sr.DEE/TrD

Sr.DEE/O

Sr.DEE/RS

DEE/P

DEE/TrD

DEE/O

DEE/TRS

AEE/P

AEE/TrD

AEE/O

AEE/TRS
गलती कर देना मामूली बात है, पर उसे स्वीकार कर लेना बड़ी बात है।
ORGANISATIONAL SETUP
OF
ELECTRICAL DEPARTMENT
Phase I – Module No. FC-01
Chain of Command - Board

Member (Traction)

Additional Member (Traction)

Adv (G)  EDRE  Adv (RS)  ED (Dev)

Director/ Joint Director assist the Adv and EDs
Chain of Command – Zonal HQ

General Member

CEE

CESE
Dy.CEE

CELE
Dy.CEE

CEDE
Dy.CEE

CEE(C)
Dy.CEE
Chain of Command – Division

DRM

ADRM

Sr.DEE/P
  DEE/P
    AEE/P

Sr.DEE/TrD
  DEE/TrD
    AEE/TrD

Sr.DEE/O
  DEE/O
    AEE/O

Sr.DEE/RS
  DEE/TRS
    AEE/TRS
Functional Setup

Setup in Electrified Division

- General Service
- Traction Distribution
- Traction Rolling Stock
- Traction Operation
Functional Setup

Setup in Non Electrified Division

General Services

- Power Supply
- Air Conditioning
- Train Lighting
General Services Deals with-

Electrical Power
- Lighting
- Pumps, lifts, Escalators
- Air-conditioning
- Substation, Distribution network

Coaching
- Train Lighting Maintenance
- AC coaches
- POH shops
Traction Distribution Deals with:

- Overhead Distribution (OHE)
- Power Supply Installation (PSI)
- SCADA/ Traction Power Control
Traction Rolling Stock Deals with-

Loco Shed

EMU/ MEMU Sheds

POH/ MTR Shops
Traction Operation Deals with:-

Loco Management

Crew Management / Training

Trip Sheds
गलती कर देना मामूली बात है, पर उसे स्वीकार कर लेना बड़ी बात है।
VARIOUS UNITS OF RAILWAYS

Phase I – Module No. FC – 01
Functional Setup

Other Organizations

Centre for Railway Electrification

IRIEEN, Nasik Road

RDSO
Functional Setup

Other Functional Setup

Electrical Department

ICF  RCF  CLW  DLW  RWF  DFC
Central Organization for Railway Electrification (CORE) was set up in 1979 under the Ministry of Railways, at Allahabad. The responsibility entrusted was to carry out railway electrification over the entire network of Indian Railways.
The organization is headed by a General Manager. It has various project units namely: Ambala, Lucknow, Jaipur, Secunderabad, Chennai, Bhubaneswar, Ahmedabad, New Jalpaigudi, Jabalpur, Kolkata and Danapur. These units are in the process of electrifying important Railway routes for harnessing maximum benefits from their traffic potential. As of now about 65.4% of freight and 51.2% of passenger traffic is hauled by electric traction on Indian Railways.
During the first three years of 12th Five Year Plan (2012-17), 5,772 Route Kilometer (RKM) of Railway Track has been electrified against the total target of 6500 RKM. As on 31.03.2016, total electrified RKM stands at 27,999. During the financial year 2015-16, 1,190 RKM has been electrified by CORE.
Advantages of Railway Electrification

i) **Energy Conservation through Railway Electrification:**

Railway transport is far more energy efficient as compared to road transport. Railways are;

a) Six times more energy efficient as compared to road,

b) Four times more economical in land use

c) Six times more cost effective vis-à-vis road in construction costs for comparable levels of traffic. Among the modes of rail transport, electric traction is the most energy efficient.
ii) Role of Electric Traction in Suburban Transport:

- Electric Multiple Units (EMUs) are ideal for suburban services with higher acceleration and braking features required for frequent starts and stops. EMU services form the backbone of suburban transportation in the metropolitan cities of Mumbai, Kolkata and Chennai. Electrification has made possible the introduction of EMU services in many suburban like main line sections. These services have become extremely popular.
The Institute was set up in the year 1988 at Nasik Road, Maharashtra, for imparting training to Electrical Engineers of Indian Railways and other departments involved in train-operation. It is located at Nasik Road, about 188 Kms Northeast of Mumbai. The Institute is headed by the Director. He is assisted by a team of Nine Faculty members, who are having practical experience as well as technical qualifications.
As laid down by the Railway Board, the Institute imparts training as a statutory measure to:

- IRSEE Probationers.

- Integrated orientation course for Group-B Officers in all aspects of the working of Electrical Department before their absorption in Group-A services.

- Senior Professional Development Course for Junior Administrative Grade officers prior to there being considered for promotion to Selection Grade.
In addition to the above, short term special courses are also being conducted throughout the year on specialized subjects with the latest technical know-how and as requests received from zonal railways.

With the commitments ranging across many facets of electrical engineering applications, IRIEEN is becoming increasingly aware of its role in training officers in state of art technology. Courses covering most aspects of railway electrical engineering from basic to advanced levels are held throughout the year.
IRIEEN is flexibly responding to rapid changes of today and preparing engineers for a new era. For achieving the above objectives IRIEEN has developed world class infrastructure.
One of the main departments of the Indian Railways, Electrical department shoulders lot of responsibility in proper operation of railway services. With Railway Electrification on the rise, Electric traction hauls almost 60% of freight traffic and 48% of passenger traffic.

Electrical department is represented in the board by Member Electrical, ex officio Secretary to the Govt. of India.
At zonal head quarters CEE (Chief Electrical Engineer) heads the department and in the division there are mostly four Sr. DEE's each of whom head the following areas:

- Traction Rolling Stock Operation
- Traction Distribution
- General Services
- Traction Rolling Stock
Vision

To develop safe, modern and cost effective Railway technology complying with Statutory and Regulatory requirements, through excellence in Research, Designs and Standards and Continual improvements in Quality Management System to cater to growing demand of passenger and freight traffic on the railways.
Governing Council

Governing Council comprises of Chairman, Railway Board as Chairman and Financial Commissioner, Member Engineering, Member Mechanical, Member Staff, Member Electrical, Member Traffic, Addl. Member (Planning)/Railway Board and Director General, RDSO as its members. The functions of Governing Council are:

• To identify and approve the R&D projects for technology development on Indian Railways.
• To review the progress of projects.

• To determine the quantum of direct investment in technology development within the overall allocation of funds under the plan head ‘Railway Research’.

• To give direction for improving the working of RDSO.
Functions

RDSO is the sole R&D organization of Indian Railways and functions as the technical advisor to Railway Board, Zonal Railways, Production Units and performs the following important functions:
Quality Policy

To develop safe, modern and cost effective Railway technology complying with Statutory and Regulatory requirements, through excellence in Research, Designs and Standards and Continual improvements in Quality Management System to cater to growing demand of passenger and freight traffic on the railways.
Started in 1952, the **Integral Coach Factory** (ICF) is located in Perambur, a suburb of Chennai, India. Its primary products are rail coaches. Most of the coaches manufactured are supplied to the Indian Railways, but it has also manufactured coaches for railway companies in other countries, including Thailand, Burma, Taiwan, Zambia, Philippines, Tanzania, Uganda, Vietnam, Nigeria, Mozambique and Bangladesh. Recently, ICF exported coaches to Angola.
Vision

To become Global Leader in the field of manufacture of state-of-the-art Rail Carriages including Diesel and Electrical Train Sets.
**Mission**

1. To be a centre for design, development and manufacture of Light weight Rail Carriages and High speed Diesel and Electrical Train sets.

2. To pursue sustained and continuous improvement in reliability and performance of product leading to customer satisfaction.

3. To develop human resource by enhancement of technical and managerial skills.

4. To promote value based work culture for excellence in corporate governance.
**Production**

ICF’s initial plan was to produce 350 Broad Gauge Third Class shells (unfurnished body of the Railway Coaches) only, which were to be furnished by the Zonal Railway’s workshops. Later, in view of the severe limitation of capacity of the Railway workshops and also to take advantage of mass production, a separate Furnishing Division was added on 2nd October, 1962. The capacity was progressively expanded from the initial 350 shells to 750 fully furnished coaches per annum by 1973-74 with additional inputs. This was enhanced progressively from 850 coaches during 1986-87 to 1000 coaches in 1990-91. The modernization project is under last stage of execution to augment capacity to 1250 coaches and will be over by 2010-11. Capacity is further being enhanced to 1500 coaches per annum through infrastructure additions and modernization of machines.
The design concept of the coach stipulates that the roof, side wall, end wall and the under frame are joined together by welding, to form a fully integral coach shell. The end-wall construction has been made specially strong to make it anti-telescopic to ensure maximum safety to passengers. Further, crashworthy features are provided with CBC design to minimize impact on passengers during accidents/derailments. From the basic design handed down by the collaborators, ICF has diversified having established its expertise and skill in this field, to design and manufacture more than 350 different types of coaches for Indian Railways and export market. Every time a new type of coach is launched, emphasis is laid on improving passenger comfort, passenger safety and higher speeds. ICF follows standard inspection procedures to ensure quality from raw material stage to the finished coach.
ICF has been meeting the needs of the Indian Railways for varied types of coaches, however sophisticated the type may be. Some of the important types are:

- **Self Propelled Coaches**
- **Air-conditioned & Non-airconditioned Passenger Coaches**
- **Special Coaches**
Self Propelled Coaches

- Electric Multiple Units for suburban services in Metropolitan cities
- Diesel Rail Cars
- Metro Coaches for Kolkata Metro Railways
- Diesel Electric Multiple Units & Diesel Hydraulic Multiple Units for non-electrified routes and Mainline Electric Multiple Units for long distance inter-city commuter ship.
- Accident Relief Trains / Medical Vans
- OHE Inspection Cars
Air-conditioned & Non-airconditioned Passenger Coaches

- Air-conditioned Sleeper Coaches of first & second class
- Air-conditioned Chair Cars of first and second class
- Double Decker Coaches with seating capacity for 148 passengers as against the conventional 90 passengers.
**Special Coaches**

- Air-conditioned & Non-air-conditioned Pantry Cars
- High Capacity Power Cars for Shatabdi & Rajdhani Express Trains
- Air-conditioned Military Ward and Saloon Cars for Indian Army.
- Air-conditioned Saloon Cars, Dining Cars, Bar & Restaurant Cars, luxury suites for luxury tourist trains like Palace on Wheels (WR), Deccan Odyssey (CR), The Golden Chariot (SWR), Royal Rajasthan on Wheels (NWR) and Maharaja Express of IRCTC, Lifeline Express for operation of hospital on wheels, Jet Deflector Crane Cars, Inter Communication Coaches for DRDO.
ICF’s achievement on the export front has been enviable since its inception. Against stiff international competition from more advanced countries like Japan, etc., ICF secured several export orders, most of which are repeat orders. ICF has bagged a number of awards for Export Excellence also.
Established in 1986, RCF is a coach manufacturing unit of Indian Railways. RCF has already carved a niche in the industrial scenario of the country at large and Indian Railways, in particular. After turning out its first coach in March 1988, RCF has moved on to become the largest and most modern coach manufacturing unit of Indian Railways. At present more than 28,000 RCF built coaches are traversing the length and breadth of our nation. Every year RCF is adding more than 1600 coaches to this fleet, which includes AC and Non-AC coaches for Broad Gauge.
RCF is equipped with a state-of-the-art CAD centre and CNC machines to undertake design and manufacture of bogies, shells (both with stainless steel and corten steel). FRP interiors as per customer’s requirement. The state-of-the-art manufacturing facilities and processes have enabled RCF to achieve excellence in Design, Development, Manufacture, Installation and after sales service of Railway Coaches with a view to ensure enhanced satisfaction of the Rail customer.
The factory is located at a distance of 7 kms. from the historical city of Kapurthala. The integrated township is very well planned and boasts of lush green surroundings. It is considered one of the best residential complexes in the country. RCF is a self contained unit with its own shopping complex, six schools, banks with ATM facilities and a 76 bedded hospital. Apart from this, RCF colony has a beautiful lake complex, a large sports stadium, an 18-hole golf course, synthetic lawn-tennis courts, Astroturf Hockey Stadium, international size swimming pool, skating rink and other sports facilities.
• Overview

Founded in 1950 the Indian Railway owned industrial unit is named after the Indian freedom-fighter Chittaranjan Das. The manufacturing unit was established at a place close to the Chittaranjan railway station. The 18.34 km² (4,530 acres) township, which included a factory, 191 km (119 mi) of roadways, 43 schools, 9,131 staff quarters, 8 clinics (including a 200-bed hospital) and 7 markets, was built at a cost of ₹140 million (US$2.1 million) and had a population of over 80,000.
The factory commenced the production of steam locomotives on the 26 January 1950 (the date when India formally declared itself a Republic), in collaboration with the North British Locomotive Company. On November 1, 1950 Indian President Dr. Rajendra Prasad formally dedicated the first steam rail-engine produced by the company (a WG class locomotive bearing the registration number 8401) to the freedom fighter Deshbandhu Chittranjan Das. The name of the nearby railway station Mihijam was also changed to Chittaranjan. Many of the specialized machinery required for steam locomotive manufacture was obtained from the Vulcan Foundry in England, previously a major supplier of locomotives to India, which at this time was moving from building steam locomotives to diesel.
Post-1968 the factory began to manufacture diesel-hydraulic locomotives. The production of steam and diesel locomotives were discontinued in 1973 and 1994 respectively. The company has since been manufacturing only electric rail-engines. It is now the only government electric loco producing factory in India.

The factory obtains its iron & steel from IISCO Steel Plant, Asansol and Tata Steel, Jamshedpur and hydel power from Maithon Dam. The township under CLW is bordered by high boundaries and 3 main gates, and guarded by Railway Protection Force (RPF), Railway Protection Special Force (RPSF) and also West Bengal police.
"To be a world class manufacturer of reliable, cost-effective, state of the art Diesel-electric locomotives."
Our Mission

• “We shall achieve our vision through” Focus on quality for sustained and continuous improvement in reliability & performance on the product leading to customer satisfaction.

• Developing core competence with due emphasis on innovation, human resource development and team work.

• Achieving environmental excellence by prevention of pollution, reduction of emissions, energy conservation and preservation of natural resources.
Rail Wheel Factory (RWF)
Till early 1980s Indian Railways was importing about 55% of requirement of wheels and axles. Indigenous capacity was available only at Tata Iron & Steel Company [TISCO] and Durgapur Steel Plant [DSP]. The TISCO plant was technically not capable of meeting the changing requirement of wheels and axles for the new designs of rolling stock and production was discontinued. DSP was only able to partially meet Indian Railways’ needs. The cost of imports was high with prices rising in the world market.
Financing of imports, delays in supplies and limited availability of foreign exchange adversely affected wagon production and rolling stock maintenance. It was in this context that in the early 1970s the Railway Ministry felt the necessity for setting up a new specialized Production Unit for manufacture of rolling stock wheels and axles as import substitute. The ultimate objective was that DSP and the Rail Wheel Factory [RWF, formerly Wheel & Axle Plant] should be able to totally meet Indian Railways requirement for standard wheels and axles so that their import could be stopped.
An extensive study was made of the latest technology and equipment available globally possibility of collaboration and foreign exchange requirement. Based on this study the Rail Wheel Factory project was conceived in the mid 70s with IR deciding to:

- Adopt the cast wheel technology developed by M/S Griffin Wheel CO., USA for wheel manufacture. American Railroads have been using cast wheels for freight operations while European Railways use forged wheels.
Adoption of cast wheel technology was found more suitable as the productivity of the plant is higher and cost of production lower as compared to forged wheels. The net saving in foreign exchange on wheel imports was estimated at Rs.8 Crores per annum.

Undertake axle forging on special purpose Long Forging Machine followed by heat treatment furnaces with automated conveyors for movement of axles.
• Provide axle-machining facilities incorporating profile copying lathes, special purpose end machining equipment and a wheel set assembly complex with integrated engineering for handling and movement of axles.

• The Planning Commission sanctioned the Rail Wheel Factory Plant project in 1978 at a cost of Rs.146 Crores. Trial production commenced during 1983. Late Smt. Indira Gandhi, the then Prime Minister of India formally commissioned the plant on 15 September 1984. To reinforce the fact that we belong to the Indian Railways Family and to display our commitment to change with times, the factory was renamed as RAIL WHEEL FACTORY on 15 February 2003. Along with the new name, the factory also adopted a new corporate logo.
During April 2013, RWF has been re-certified by M/s. Indian Register Quality System (IRQS), with latest version of Integrated Management System (IMS) encompassing (1) Quality Management System conforming to the standards of ISO 9001:2008, for manufacture of wheels, axles and wheel sets, (2) Environment Management System to the standards of ISO 14001:2004 & (3) Occupational Health and Safety Management system to the standards of OHSAS 18001:2007, for all activities related to manufacture of Wheel, Axle & Wheel sets, support activities such as Canteen, Hospital, Kendriya Vidyalaya and maintenance infrastructure in township.
DFCCIL

Dedicated Freight Corridor Corporation of India
Dedicated Freight Corridor Corporation of India (DFCCIL) is a Special Purpose Vehicle set up under the administrative control of Ministry of Railways to undertake planning & development, mobilization of financial resources and construction, maintenance and operation of the Dedicated Freight Corridors. DFCCIL was incorporated in October 2006 under Indian Companies Act 1956.
The plan to construct dedicated freight corridors across the country marks a strategic inflexion point in the history of Indian Railways that has essentially run mixed traffic across its network. Once completed, the dedicated freight corridors will enable Indian Railways to improve its customer orientation and meet market needs more effectively. Creation of rail infrastructure on such a scale - unprecedented in independent India – is also expected to drive the establishment of industrial corridors and logistic parks along its alignment.
## What sets DFC apart

<table>
<thead>
<tr>
<th>Freight train speed</th>
<th>Indian Railways network</th>
<th>Dedicated Freight Corridor network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>25 (kmph)</td>
<td>Max speed</td>
</tr>
<tr>
<td></td>
<td>75 (kmph)</td>
<td>100 (kmph)</td>
</tr>
<tr>
<td>Freight train vital stats</td>
<td>700 mts  58 wagons  5,000 tonne</td>
<td>1500 mts  120 wagons  13,000 tonne</td>
</tr>
<tr>
<td>Locomotive power</td>
<td>4000-5000 HP</td>
<td>12,000 HP (Eastern corridor)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,000 HP (Western corridor)</td>
</tr>
<tr>
<td>Laying of track</td>
<td>Manual 100-150 mts/day</td>
<td>Mechanised 1.5 km/day</td>
</tr>
<tr>
<td>Time-tabled freight trains</td>
<td>Will initiate on Pilot basis</td>
<td>All trains will run as per timetable</td>
</tr>
</tbody>
</table>
Salient features

• Dedicated Freight Corridors are proposed to adopt world class and state-of-the-art technology. Significant improvement is proposed to be made in the existing carrying capacity by modifying basic design features.

• The permanent way will be constructed with significantly higher design features that will enable it to withstand heavier loads at higher speeds.
Simultaneously, in order to optimize productive use of the right of way, dimensions of the rolling stock is proposed to be enlarged. Both these improvements will allow longer and heavier trains to ply on the Dedicated Freight Corridors.

The following tables provide comparative information of the existing standards on Indian Railways and the proposed standard for DFCC.
# Upgraded Dimensions of DFC

<table>
<thead>
<tr>
<th>Feature</th>
<th>Existing</th>
<th>On DFC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Moving Dimensions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>4.265 m</td>
<td>7.1 m for Western DFC 5.1 m for Eastern DFC</td>
</tr>
<tr>
<td>Width</td>
<td>3200 mm</td>
<td>3660 mm</td>
</tr>
<tr>
<td><strong>Container Stack</strong></td>
<td>Single Stack</td>
<td>Double Stack</td>
</tr>
<tr>
<td>Train length</td>
<td>700 m</td>
<td>1500 m</td>
</tr>
<tr>
<td>Train Load</td>
<td>5,000 Ton</td>
<td>13,000 Ton</td>
</tr>
<tr>
<td>Feature</td>
<td>Existing</td>
<td>On DFC</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Heavier Axle Loads</td>
<td></td>
<td>25 t Bridges &amp; formation designed for 32.5 t</td>
</tr>
<tr>
<td>Axle Load</td>
<td>22.9t/25t</td>
<td></td>
</tr>
<tr>
<td>Track Loading Density</td>
<td>8.67 t/m</td>
<td>12 t/m</td>
</tr>
<tr>
<td>Maximum Speed</td>
<td>75 Km/h</td>
<td>100 Km/h</td>
</tr>
<tr>
<td>Grade</td>
<td>Up to 1 in 100</td>
<td>1 in 200</td>
</tr>
<tr>
<td>Curvature</td>
<td>Up to 10 degree</td>
<td>Up to 2.4 degree</td>
</tr>
<tr>
<td>Traction</td>
<td>Electrical (25 KV)</td>
<td>Electrical (25 KV AT Feeding)</td>
</tr>
<tr>
<td>Station Spacing</td>
<td>7-10 Km</td>
<td>40 Km</td>
</tr>
<tr>
<td>Signaling</td>
<td>Absolute/Automatic with 1 Km spacing</td>
<td>Automatic with 2 Km spacing</td>
</tr>
<tr>
<td>Communication</td>
<td>Emergency Sockets/Mobile Train Radio</td>
<td>Mobile Train Radio</td>
</tr>
</tbody>
</table>
Make in India Initiative

Major equipment which will be supplied first time such as transformer, auto transformer & other conductor will be supplied as per international specification. Part (upto 50%) quantity of such equipment can be supplied through technological transfer agreement through their Indian partner under “Make in India” program. The developed indigenous capability will be useful corridors, high speed railways, Indian railways & other metro system.
ELECTRICAL SYSTEM

1. ADOPTION OF 2X25 KV AT FEEDING SYSTEM - will enable long haul & heavy haul operation.
2. HIGH RISE OHE - suitable for double stack operation on flat wagons on DFCC.
3. COMPUTER SIMULATION TOOL - to optimize rating of major equipment such as traction transformers etc.
4. SCADA AND PROTECTION SYSTEM - State of the art Supervisory Control & Data Acquisition (SCADA) system & numerical protection scheme will enhance safety of power system.
5. SUPERIOR COMPOSITION & PROFILE OF CONTACT & CATENARY WIRE WITH IMPROVED REGULATING EQUIPMENT
6. EARTHING AND BONDING STRATEGY - to comply international standards so as to achieve desired human/equipment safety as per EN 50122-1.
7. GREEN INITIATIVES - DFCCIL is expected to offer reduction of more than 450 million ton of CO2 in first 30 years of operation leading to reduced Green House Gas (GHG) emissions in transport sector in India.
व्यक्ति अपने जन्म से नहीं अपितु अपने कर्म से महान होता है।
Duty of JE & SSEs

Phase I - Module No. FC - 01
Electrical Engineering is one of the important departments responsible for the maintenance of electrical locomotive, Traction distribution and overhead equipment, train lighting and air conditioning, power supply etc.
JE is frontline manager on the Railways and is the in-charge of a Section directly supervising the work under him for production, repair, maintenance, upkeep and overhauling of Locomotives, Coaches, Electrical equipments, Plants, etc. They look after multifarious duties and responsibilities taking care of all types of technical requirements, safety, efficiency & productivity of the Railways.
1. Planning, allocation and execution of work.


3. Staff postings to various Load Centers in accordance to the requirement.

4. On the job training and identification of training needs to workers.

5. Incorporating on the job training for new jobs and new workers.
6. Ensuring sound Load Centre Planning, Process Planning, Machinery and Plant, Tool Planning, Jig & Fixture Planning, Identification and Execution of alternate process in case of failure or shortfall in the existing process.

7. Ensuring control of documents and data for effective implementation and adherence of production/maintenance schedules.

8. Ensuring availability of required Raw material/semifinished/finished products for all the activities of the Shop.

9. Co-ordination between staff and Officer.
10. Ensuring sound in process for effective Quality Control.

11. Analysis of Rejections and implementation of Corrective and Preventive Action.

12. Effective handling, storage, packing, preservation and delivery of Raw material/ semi finished/ finished products.


14. Assist in restoration work during the natural calamities

15. Maintenance of good Industrial relation by ensuring implementation of welfare measures, safety regulations, etc.
Non-Technical Duties

1. Maintenance of various Files and Records for ISO, EMS and QMS.

2. Maintenance of History Cards, Record of Break Down & under Repair etc.

3. Witnessing Gate attendance card punching of all employees of the Shop and authorizing form.

4. Payment of Wages to the employees of the Shop.

5. Maintenance of various Files and Records regarding staff matters.
6. Maintenance of Records and Files regarding all activities related to the Sections.

7. Maintenance of Attendance and Incentive Record for all employees of the section.

8. Claiming wages and ensuring distribution of wages to all employees working in section.

9. Ensuring smooth conduction of election for organized labour, Society etc.


11. Court witness and certifying the Railway properties in court of law.
On the RAILWAYS As “Frontline Managers” SSEs are responsible for Management and Supervision of the following:

1. Production, Repair, Maintenance, Overhauling, Designing & Quality Control - of various equipment, Transport and Material Handling facilities, allied Machineries, Plants, Equipments, Spare parts & Assemblies;
2. Safety of Men, Material & Passengers through intensive Supervision, continuous Inspection & Quality Control of various equipment. The responsibility of fitness for operational safety and safe working of all these assets primarily lies with the technical supervisors - (including allied Machineries, Plants and Equipments).

3. Fitness certificates of all these assets are required to be issued by the technical supervisors prior to their operation. (cannot move till it is rectified and certified as “Fit to move” by the concerned technical supervisor).
4. Time bound turn over, repair & maintenance - to achieve Production targets and train schedules (including running repairs) of Plants & Equipments, etc. - to ensure safe, reliable and punctual train operations, effective execution of “Safety Norms” and “Quality Control” etc. – in all conditions.

5. Inventory Control and Material Management: Technical Supervisors are responsible for inventory control, material management and safe custody and storage of Railway properties such as Machineries & Plants, Quarters etc for their repair & maintenance at sites.

6. Optimum utilization of men and material resources - including large number of Technicians, Senior Technicians, Master Craftsmen and Helpers etc. and machines tools & equipment.
7. Effective execution of administrative policies and plans

8. Early restoration of Traffic after Accidents through effective “Disaster Management”.

9. Ensuring staff discipline, holding inquiries, supervision of wage disbursement and effective house keeping.

10. Human Resource Management and maintenance of Industrial peace through on the spot redressal of day-to-day grievances of the staff.
मनुष्य के रूप में परमात्मा सदा हमारे सामने हैं, उसकी सेवा करो।