TRANSPORT OPERATIONS

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GIGANTIC DIMENSIONS OF IR

- **DAILY TRANSPORT OUTPUT**
  - **–2.2 MILLION TRAIN KILOMETERS**
  - **–20 MILLION PASSENGERS**
  - **–1.8 MILLION TONNES FREIGHT LOADING**
  - **–9556 PASSENGER TRAINS RUN**
  - **–6500 FREIGHT TRAINS**
- **PASSENGER VOLUMES EQUIVALENT TO COMBINED POPULATION OF OVER 40 COUNTRIES**
- **COVER THE ROUND TRIP DISTANCE BET. EARTH & MOON FOUR TIMES A DAY**

OPERATIONS - MICRO LEVEL

SYSTEMS OF WORKING ON IR

- **THE SYSTEMS OF WORKING HAVE TO ENSURE SAFE AND EFFICIENT TRANSPORTATION**

- **THEY ARE GOVERNED BYGENERAL & SUBSIDIARY RULES FRAMED BY MINISTRY OF RAILWAYS**

SYSTEMS OF WORKING ON IR

- **SIX SYSTEMS ARE PERMITTED**
  - **THE ABSOLUTE BLOCK SYSTEM**
  - **THE AUTOMATIC BLOCK SYSTEM**
  - **THE FOLLOWING TRAINS SYSTEM**
  - **THE PILOT GUARD SYSTEM**
  - **THE TRAIN-STAFF AND TICKET SYSTEM**
  - **THE ONE TRAIN ONLY SYSTEM**

ONLY THE FIRST TWO SYSTEMS ARE IN USE ON BUSY SECTIONS

SYSTEMS OF WORKING ON IR

- THE ABSOLUTE BLOCK SYSTEM ENSURES THAT THERE IS ONLY ONE TRAIN BETWEEN TWO BLOCK STATIONS AT ANY GIVEN POINT OF TIME
- TRAINS MOVE ON A SYSTEM OF LINE CLEAR

- IN AUTOMATIC BLOCK SYSTEM THERE IS ONLY ONE TRAIN IN AN AUTOMATIC SIGNALLING SECTION AT A TIME
- THESE SECTIONS ARE EVENLY SPACED AND INTERPERSED BY AUTOMATIC SIGNALS
- TRAINS MOVE BASED ON THE ASPECTS OF AUTOMATIC SIGNALS
- STATIONS ARE PROVIDED WITH SEMI-AUTOMATIC SIGNALS

STATIONS / TERMINALS

- **STATIONS ARE BLOCK STATIONS AND NON-BLOCK STATIONS**

- **BLOCK STATIONS FORM THE BOUNDRY OF BLOCK SECTIONS WHILE NON-BLOCK STATIONS DO NOT**

- **DEPENDING UPON FLEXIBILITY OF MOVEMENTS PERMISSIBLE WITHIN STATION LIMITS BLOCK STATIONS ARE CLASSIFIED INTO FOUR TYPES "A", "B", "C" AND "SPECIAL"**

STATIONS / TERMINALS

- **OTHER TERMINALS INCLUDE**
  - **GOODS SHEDS**
  - **PRIVATE SIDINGS / CONTAINER DEPOTS**
  - **YARDS**

- **LOADING / UNLOADING OPERATIONS ARE CARRIED OUT IN GOODS SHEDS AND PRIVATE SIDINGS /CONTAINER DEPOTS**

- **MAKING / BREAKING OF TRAINS ARE DONE IN YARDS USING SHUNTING ENGINES AS ALSO THEIR EXAMINATION / MAINTENANCE**

EXAMINATION PATTERNS

- **GENERALLY FREIGHT TRAINS ARE WORKED IN BLOCK RAKE COMPOSITIONS**
  - **FOR EXAMPLE 45 LOW-LEVEL FLATS CALLED BLC WAGONS FORM A STANDARD CONTAINER RAKE CARRYING 90 ISO CONTAINERS**

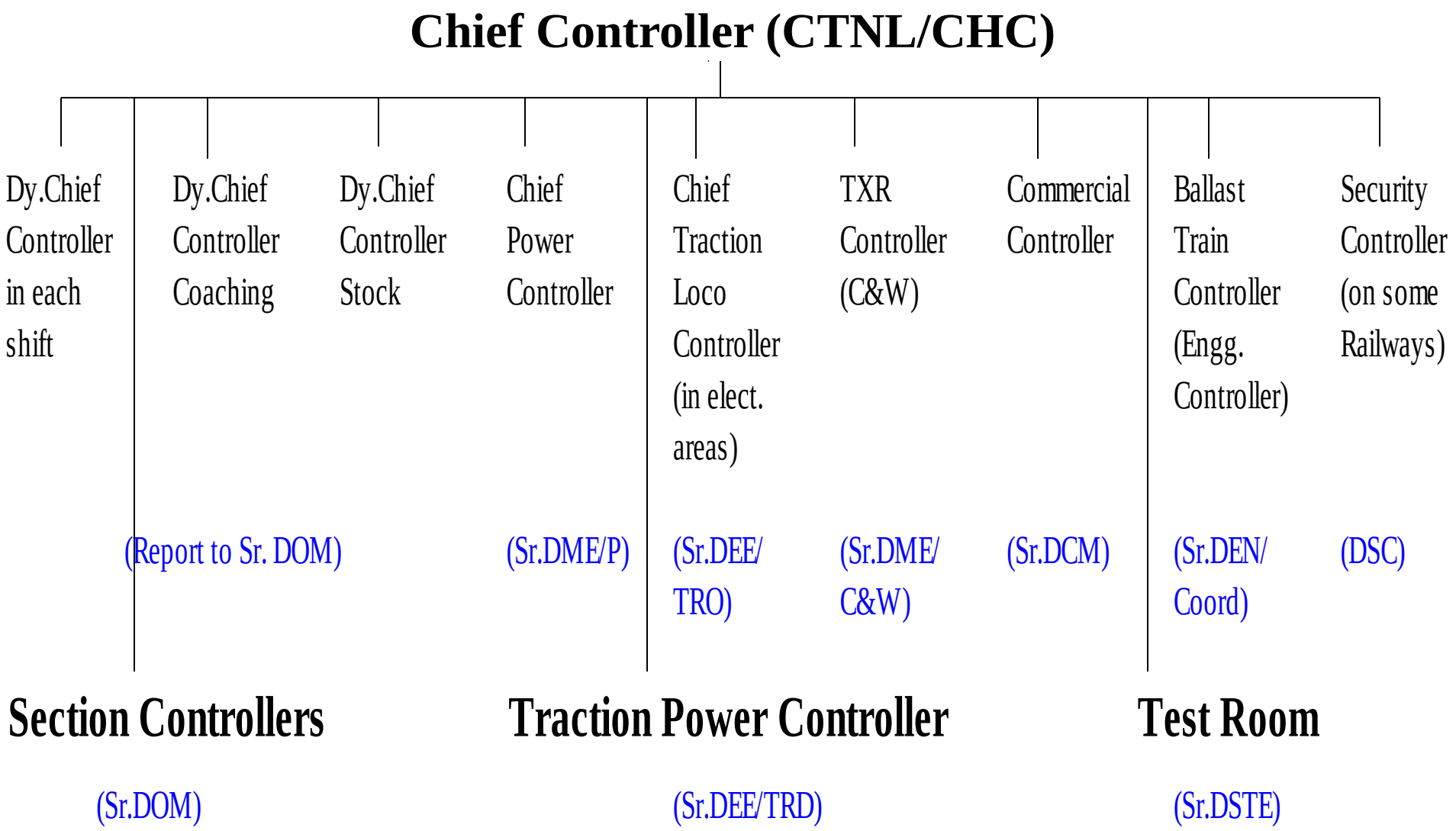
- **THE EXAMINATIONS ARE CARRIED OUT EITHER ON END-TO-END BASIS OR ON CLOSED- CIRCUIT RAKE BASIS**

- **CC RAKES RUN ON PRE-DETERMINED CIRCUITS FOR 4500 - 6000 KMS. WITHOUT IMPAIRING THEIR INTEGRITY**

Control Working
The Brain Centre

The supervision of traffic working over a given section or sections of line from a central office connected by telephones to all the stations and locomotive sheds on the section or sections.

ORGANISATION OF A DIVISIONAL OPERATING CONTROL



Functions of Control

- Systematic timing and working of all trains.
- Arranging Locomotive and Crew.
- Arranging Coaching and Goods stock.
- Close watch to avoid congestion and lack of fluidity.
- Suggest improvements.
- Educate and assist stations in correct methods of train operations especially in unusual circumstances like thick and foggy weather, accidents, break-down of communications etc.

Line Capacity

- **It is the total number of trains that can be run on a section during a period of 24 hours.**
- **Single line section number of trains that can be run each way during 24 hours.**
- **Double line section calculated for each direction separately.**
- **All this is done by plotting trains on Master Charts**

Master Charts

- **24 hours charts for every section are prepared which show the running of each Mail, Express or passenger train over the section according to its scheduled running.**
- **In between the running of trains carrying passengers, viable paths for goods trains are worked out and plotted.**
- **Such charts are called Master Charts.**

Throughput

- **Throughput of a section is the total quantum of traffic which can be transported over the section in a period of 24 hours.**
- **Includes passengers and goods carried over the section.**
- **Longer /Heavier trains can give better throughput without augmenting line capacity.**

ORDERING OF TRAINS

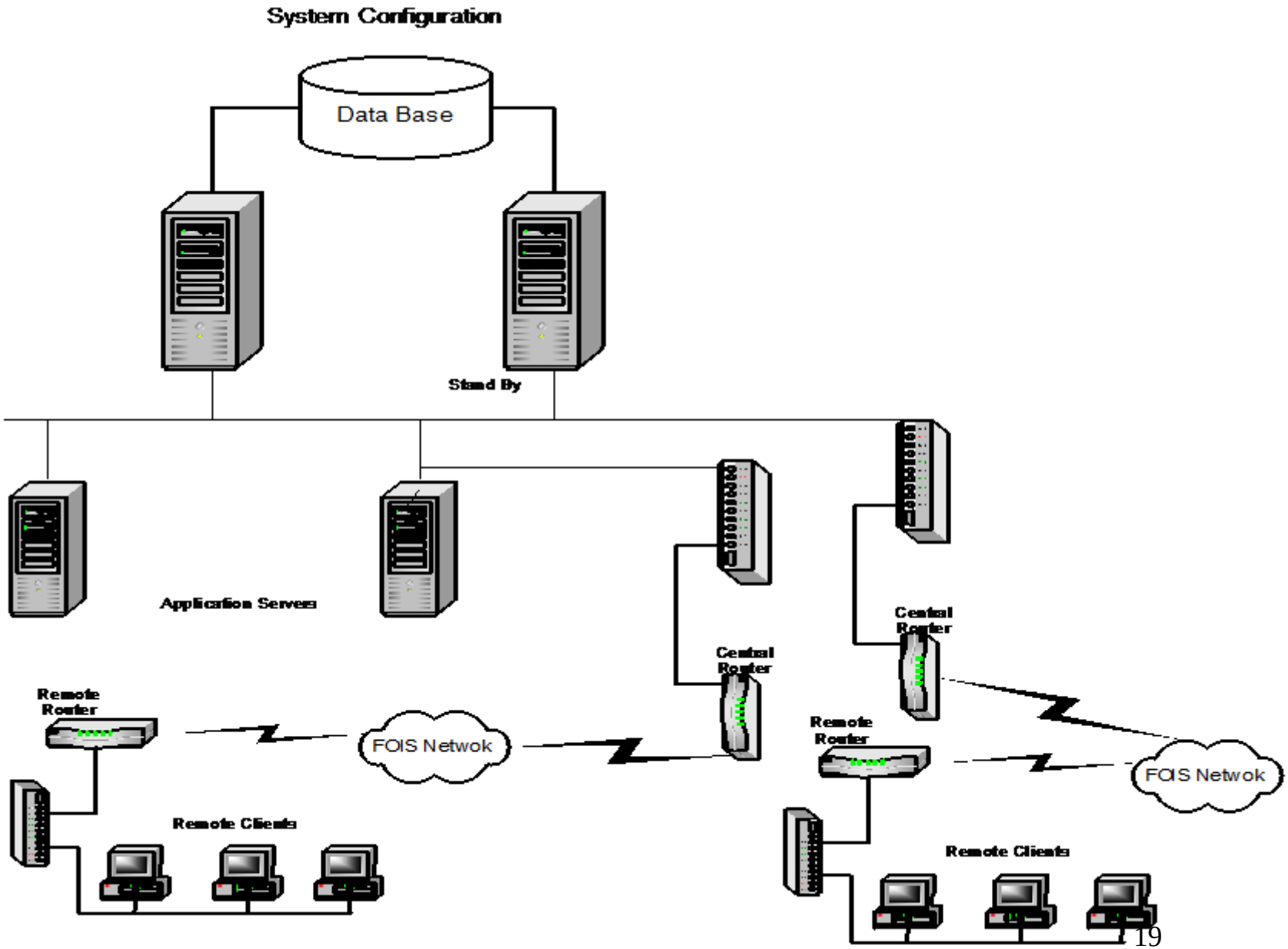
- **Concept of ordering**
  - **Sufficient materialization of consignment (goods-shed/siding)**
  - **Train load (Yard)**
  - **Feasibility of train formation in time**

ORDERING OF TRAINS

- **Ordering requires**
  - **Availability of power**
  - **Crew & Guard**
  - **Path**
- **Units that play major role**
  - **Goods-shed/siding/yard**
  - **Lobby**
  - **Loco shed**
  - **Control Office**

USE OF IT

- **AFTER MANAGING OPERATIONS MANUALLY FOR 150 YEARS, IR DECIDED TO GO IN FOR COMPUTERIZED INFORMATION SYSTEM FOR FREIGHT OPERATIONS CALLED FOIS (FREIGHT OPERATIONS INFORMATION SYSTEM) TO**
  - **FURTHER INREASE EFFICIENCY**
  - **ENSURE CONTINUOUS CARGO VISIBILITY**
  - **ENSURE TRANSPARENCY IN SHARING OF INFORMATION**
  - **ENSURE BETTER INVENTORY MANAGEMENT BY CUSTOMERS**
  - **BRING DOWN OVERALL COSTS OF BUSINESS**


System Configuration
Data Base
Stand By
Application Servers
Central Router
Central Router
Remote Router
FOIS Netwok
Remote Clients
Remote Router
FOIS Netwok
Remote Clients

SOME BENEFITS OF FREIGHT OPERATION INFORMATION SYSTEM

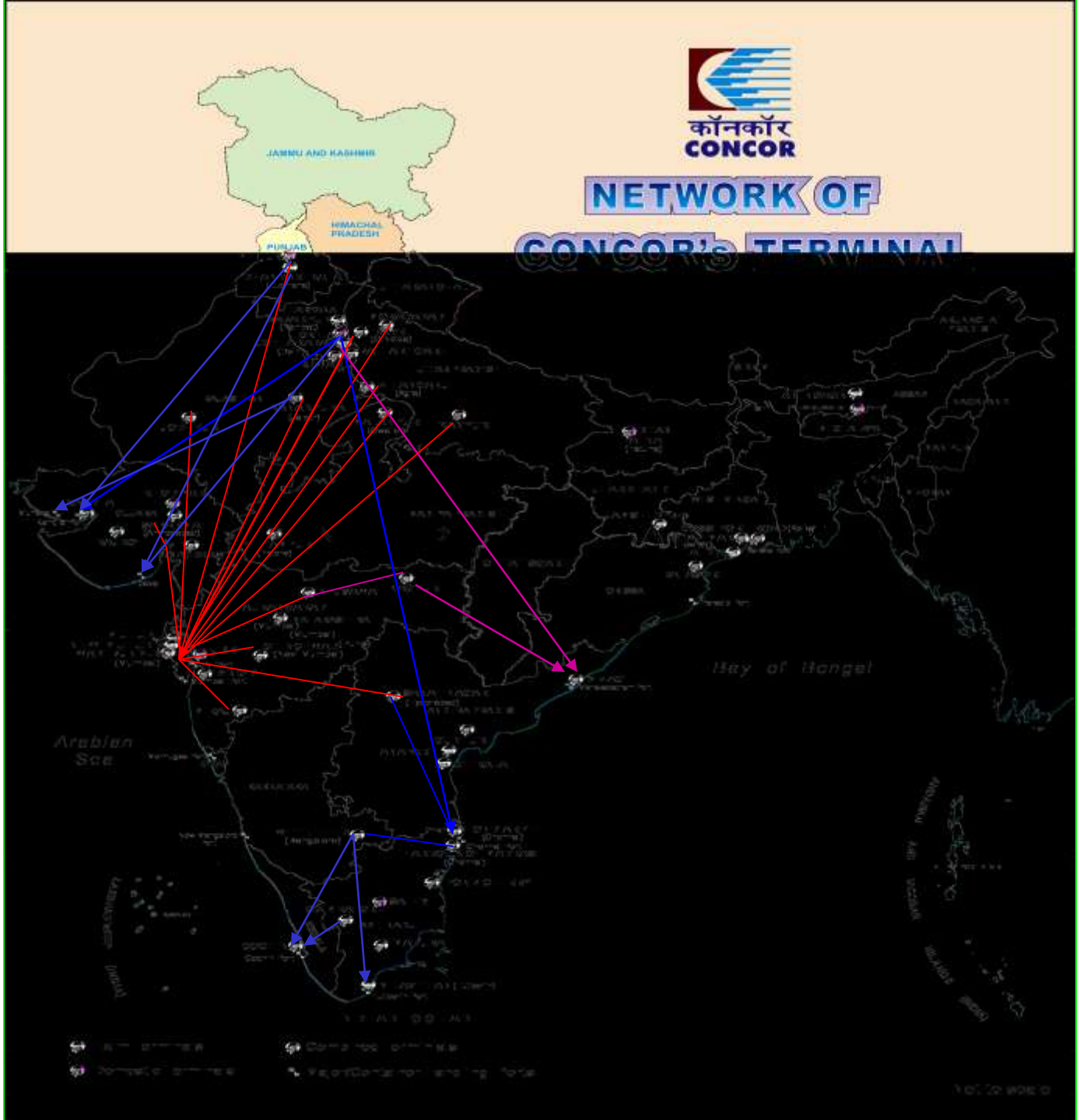
- **ELECTRONIC DATA INTERCHANGE**
- **COMPUTERIZED RAKE TRACKING / LOCATOR SYSTEMS**
- **CONSIGNMENT STATUS / LOCATION DATA**
- **TRADE DOCUMENTATION**
- **E-PAYMENT GATEWAYS**
- **MARKETING INITIATIVES**
- **BETTER MONITORING AND PLANNING BY INFORMATION SHARING**

OPERATIONS - MACRO LEVEL

Container Traffic Projections 2006-07

Location	TEUs
• JN Port	3.0 million
• Chennai	0.6 million
• Mundra/Pipavav	0.8 million
• Vizag	0.15 million
• Others	0.45 million
• Total	5.0 million

SO FAR ONLY IR'S SUBSIDIARY CONTAINCER CORPORATION (CONCOR) WAS HANDLING CONTAINER TRAFFIC FOR IR. BUT NOW PRIVATE PLAYERS HAVE ALSO BEEN PERMITTED.


JAMMU AND KASHMIR
HIMACHAL PRADESH
PUNJAB
कॉनकॉर
CONCOR
NETWORK OF
CONCOR's TERMINAL
Bay of Bengal
Arabian Sea

Growth Scenarios upto 2020

(Million Teus)

YEAR	13% growth	15% growth	20% growth
	Y-o-Y	Y-o-Y	Y-o-Y
2006-07	5	5	5
2007-08	5.65	5.75	6.00
2008-09	6.38	6.61	7.20
2009-10	7.21	7.60	8.64
2010-11	8.15	8.75	10.37
2011-12	9.21	10.06	12.44
2012-13	10.41	11.57	14.93
2013-14	11.76	13.30	17.92
2014-15	13.29	15.30	21.50
2015-16	15.02	17.59	25.80
2016-17	16.97	20.23	30.96
2017-18	19.18	23.26	37.15
2018-19	21.67	26.75	44.58
2019-20	24.49	30.76	53.50

RECENT DEVELOPMENTS ON IR

- **STRENGTHENING HIGH DENSITY NETWORK**

  - HDN COMPRISES 16% OF NETWORK (OF 63000 RKMS) BUT CARRIES 65% FREIGHT AND 55% PASSENGER TRAFFIC

  - IT COMPRISES GOLDEN QUADRILATERAL AND DIAGONALS JOINING MAJOR HUBS IN ALL THE FOUR DIRECTIONS OF THE COUNTRY VIZ-MUMBAI, CHENNAI, KOLKATA AND DELHI

  - RESEARCHES SHOW THAT FUTURE TRAFFIC IS ALSO GOING TO MATERIALIZE ON THESE ROUTES ONLY

RECENT DEVELOPMENTS ON IR

- **STRENGTHENING PORT & HINTERLAND CONNECTIVITY**

  - WITH INCREASED ECONOMIC ACTIVITY AND GLOBALIZATION, BOTH CONTAINERIZED & BULK TRAFFIC WILL HAVE AN UPSURGE

  - PORTS, BOTH MAJOR (12) & MINOR ARE ENVISAGED FOR IMPROVED RAIL NETWORK

  - HINTERLAND CONNECTIVITY COMMENSURATE WITH ABOVE

RECENT DEVELOPMENTS ON IR

- **DOUBLE STACKING OF CONTAINERS**

  - ONE ROUTE FROM WESTERN COAST PORTS TO DELHI ALREADY IDENTIFIED AND DOUBLE STACK TRAIN IS STARTING THIS MONTH

  - OTHER ROUTES ALSO SLATED FOR DOUBLE STACKING

RECENT DEVELOPMENTS ON IR

- **DEDICATED MULTI-MODAL HIGH AXLE LOAD FREIGHT CORRIDOR WITH COMPUTERIZED CONTROLLING**

  - **AXLE LOADS ENVISAGED 25 TONNES**

  - **100 KMPH FREIGHT TRAINS**

  - **MAINLY WITH A VIEW TO ACCOMMODATE GROWTH BOTH IN PASSENGER AND FREIGHT SEGMENTS AS ALSO IN BULK & CONTAINERIZED SEGMENTS**

DOVETAILING IR TO TAR

- **WIN-WIN SITUATION FOR ALL COUNTRIES IN THE REGION**
- **CAN CATER FOR**
  - **EXISTING DEMAND (TRAFFIC WHICH TAKES LONGER / CUMBERSOME LAND & SEA ROUTE AT PRESENT)**
  - **DIVERTED DEMAND (IF COST EFFECTIVENESS, RELIABILITY & EFFICIENCY CAN BE BETTERED)**
  - **GENERATED DEMAND (WHICH CAN MATERIALIZE WITH DEVELOPMENT OF THE REGIONS e.g. NORTH-EAST FRONTIER STATES OF INDIA)**

DOVETAILING IR TO TAR

- **INTER-OPERABILITY PROBLEMS ANTICIPATED**
  - **MISSING LINKS**
  - **BREAKS OF GAUGE (TP EQUIPMENTS)**
  - **AXLE LOADS**
  - **TRACTION & LOCO CHANGE**
  - **CREW WORKING**
  - **SPEEDS**
  - **ROUTE CAPACITY ON LINKS**

DOVETAILING IR TO TAR

- **INTER-OPERABILITY PROBLEMS ANTICIPATED (CONTD.)**
  - **COMPATIBILITY OF DESIGN OF ROLLING STOCK (EXCHANGEABILITY)**
  - **COMPATIBILITY OF TRAIN ASSEMBLY & LOAD SCHEDULING PRACTICES (NO READJUSTMENT OF TRAIN LOADS AT BORDERS)**
  - **TRAIN INSPECTION, BRAKE TESTING, RECORDING OF WAGON & CONSIGNMENTS DETAILS**

DOVETAILING IR TO TAR

- **OTHERS (NON-OPERATIONAL)**
  - **SECURITY CONTROL**
  - **CUSTOMS**
  - **PAYMENTS (SHARING)**
  - **UNIFIED AGENCY**

DOVETAILING IR TO TAR

FAVOURABLE FACTORS

- **GROWTH IN ECONOMY AND INTERNATIONAL TRADE**
- **STRENGTH OF RAILWAY SYSTEMS**
  - **SAFE**
  - **ENERGY EFFICIENT**
  - **ENVIRONMENT FRIENDLY**
  - **FLEXIBILITY OF TRACTION**
- **INFORMATION TECHNOLOGY**

THANK YOU