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**Survey for identification of importance of a railway section from accident point of view.
(Please Read following before proceeding further into survey)**

We are doing research on the problem of locating the Accident Relief Train (ART) facility in the context of Indian railways. The objective is to strategically locate the ARTs so that the response time to an accident site will be within the golden hour considering the vulnerability of the sections and restoration of the traffic as priority. In this research, we are also trying to figure out the relative importance of a railway section/route. An attempt is being made to quantify the importance of a train section with certain parameters, if the attainable speed and other technical parameters are the same for each section. Following four operational criteria are identified as leading parameters for decision on importance of the section.

- 1. Total No. of passenger trains being operated in the section*
- 2. Total No. of Goods trains being operated in the section*
- 3. Total No. of empty coaching rakes operated in the section*
- 4. Total No. of empty wagons rakes being operated in the section*

We need to understand the relative weight of these criteria in order to evaluate the importance of a railway section, where mixed traffic is in operation. For this purpose, you are requested to answer following questions and rate the relative importance of activity.

The ratings are to be given as per the following scale.

Rating (on a scale of 10)

Description

Equal Importance 1

moderate importance of one over other 2 to 5

Demonstrated Importance 5 to 7

Absolute and extreme Importance 7 to 9

For example, if you think that the passenger train operation is ABSOLUTELY IMPORTANT as compared to goods train the rating will be between 7 to 9

** Indicates required question*

28/06/2024, 11:05 Survey for identification of importance of a railway section from accident point of view.
<https://docs.google.com/forms/d/1U06WvOYc8obRFVSYCMq0VHh6s9BiXd9-rGoCTTSE-3w/edit> 1/5

1.Email

*

Total 6 Question

Equal Importance 1

moderate importance of one over other 2 to 4

Demonstrated Importance 5 to 7

Absolute and extreme Importance 8 to 10

2. Mark only one oval.

1, 2, 3, 4,5,6,7,8,9, 10.

3.

Mark only one oval.

1, 2, 3, 4,5,6,7,8,9, 10.

1. Compare a section with more passenger train operation viz a viz a section with more Goods train operation from severity of accident and urgency of rescue point of view? On a scale of 10, a

score 1 should be given for equal rating and if a section with the passenger trains has higher weight it should be given towards 10 on the scale.

2. Compare a section with more passenger train operation viz a viz a section with more Empty rake operation from severity of accident and urgency of rescue point of view? On a scale of 10, a score 1 should be given for equal rating and if a section with the passenger trains has higher weight it should be given towards 10 on the scale.

3. Compare a section with more passenger train operation viz a viz a section with more Empty wagon rake operation from severity of accident and urgency of rescue point of view? On a scale of 10, a score 1 should be given if both have equal importance and if a section with the passenger trains has higher importance it should be given towards 10 on the scale.

4. Compare a section with more Goods train operation viz a viz a section with more Empty coaching rake operation from severity of accident and urgency of rescue point of view? On a scale of 10, a score 1 should be given for equal rating and if a section with more Goods train has higher weight it should be given towards 10 on the scale.

5. Compare a section with more Goods train operation viz a viz a section with more Empty wagon rake operation from severity of accident and urgency of rescue point of view? On a scale of 10, a score 1 should be given for equal rating and if a section with more Goods trains has higher weight it should be given towards 10 on the scale.

6. Compare a section with more Empty coaching rake operation viz a viz a section with more Empty wagon rake operation from severity of accident and urgency of rescue point of view? On a scale of 10, a score 1 should be given for equal rating and if a section with empty coaching trains has higher weight, it should be given towards 10 on the scale.

*Please mention your Name **

*Which service do you belong to...?? **

*Your Batch of entry in service **

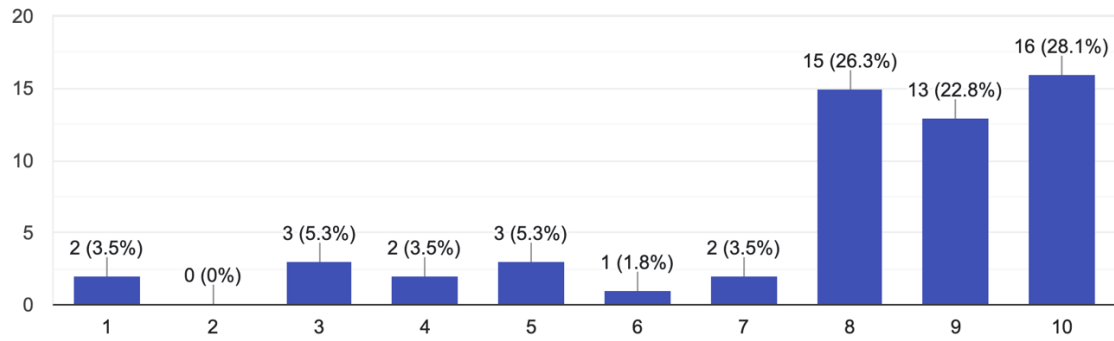
Forms.

*28/06/2024, 11:05 Survey for identification of importance of a railway section from accident point of view.
<https://docs.google.com/forms/d/1U06WvOYc8obRFVSYCMq0VHh6s9BiXd9-rGoCTTSE-3w/edit> 4/5*

*28/06/2024, 11:05 Survey for identification of importance of a railway section from accident point of view.
<https://docs.google.com/forms/d/1U06WvOYc8obRFVSYCMq0VHh6s9BiXd9-rGoCTTSE-3w/edit> 5/5*

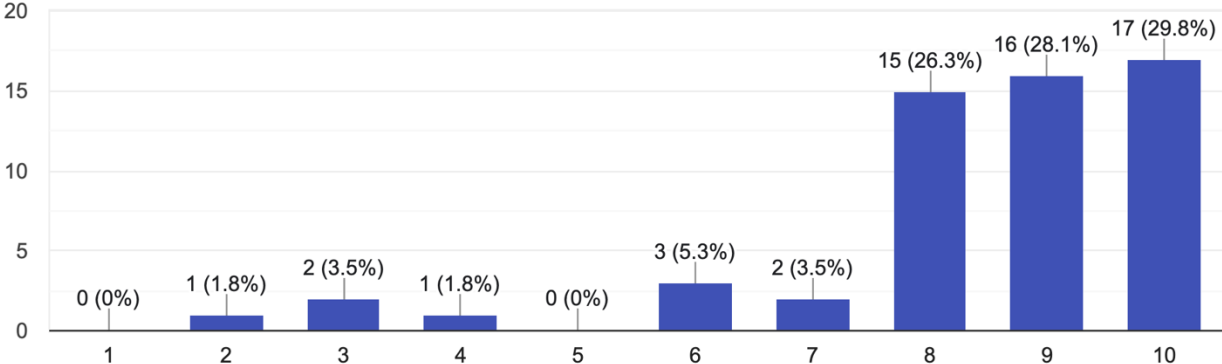
1. Compare a section with more passenger train operation viz a viz a section with more Goods train operation from severity of accident and urg... weight it should be given towards 10 on the scale.

57 responses



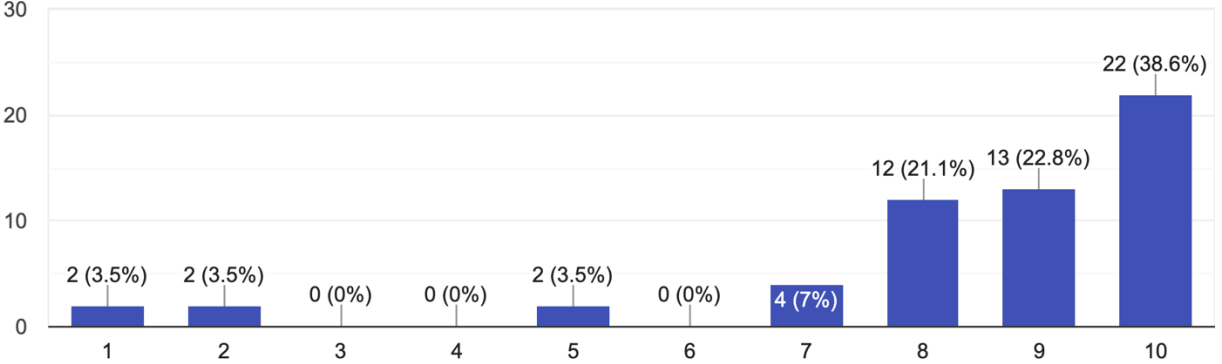
2. Compare a section with more passenger train operation viz a viz a section with more Empty rake operation from severity of accident and ur... weight it should be given towards 10 on the scale.

57 responses



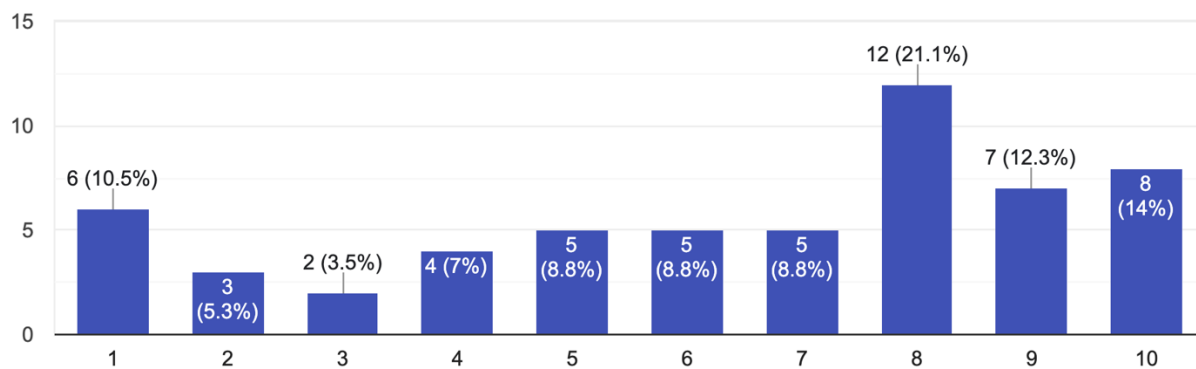
3. Compare a section with more passenger train operation viz a viz a section with more Empty wagon rake operation from severity of accident an...tance it should be given towards 10 on the scale.

57 responses



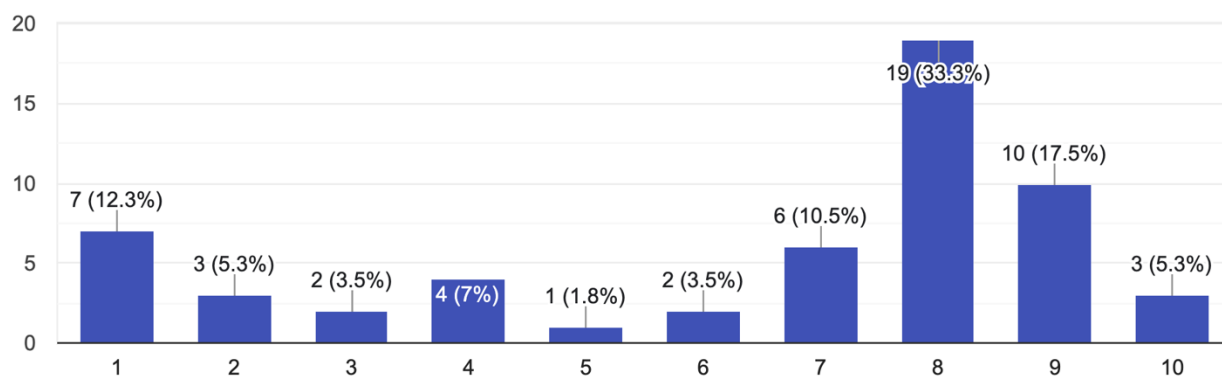
4. Compare a section with more Goods train operation viz a viz a section with more Empty coaching rake operation from severity of accident ...weight it should be given towards 10 on the scale.

57 responses



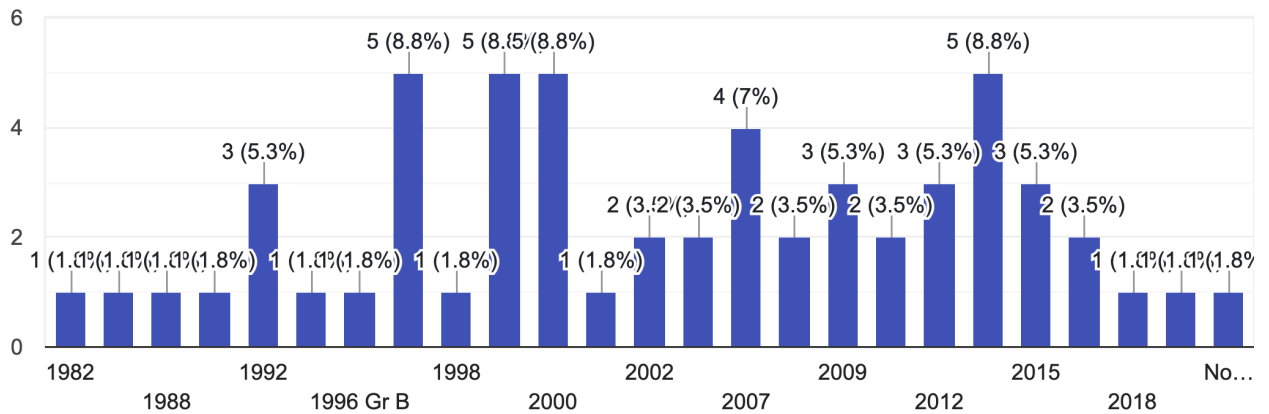
5. Compare a section with more Goods train operation viz a viz a section with more Empty wagon rake operation from severity of accident and urgen...weight it should be given towards 10 on the scale.

57 responses



Your Batch of entry in service

57 responses



The comparative responses of the Participants:

1. Compare a section with more passenger train operation viz a viz a section with more Goods train operation from severity of accident and urgency of rescue point of view ? On a scale of 10, a score 1 should be given for equal rating and if a section with the passenger trains has higher weight it should be given towards 10 on the scale.	2. Compare a section with more passenger train operation viz a viz a section with more Empty rake operation from severity of accident and urgency of rescue point of view ? On a scale of 10, a score 1 should be given for equal rating and if a section with the passenger trains has higher weight it should be given towards 10 on the scale.	3. Compare a section with more passenger train operation viz a viz a section with more Empty wagon rake operation from severity of accident and urgency of rescue point of view ? On a scale of 10, a score 1 should be given if both have equal importance and if a section with the passenger trains has higher importance it should be given towards 10 on the scale.	4. Compare a section with more Goods train operation viz a viz a section with more Empty coaching rake operation from severity of accident and urgency of rescue point of view ? On a scale of 10, a score 1 should be given for equal rating and if section with more Goods trains has higher weight it should be given towards 10 on the scale.	5. Compare a section with more Goods train operation viz a viz a section with more Empty wagon rake operation from severity of accident and urgency of rescue point of view ? On a scale of 10, a score 1 should be given for equal rating and if section with more Goods trains has higher weight it should be given towards 10 on the scale.	6. Compare a section with more Empty coaching rake operation viz a viz a section with more Empty wagon rake operation from severity of accident and urgency of rescue point of view ? On a scale of 10, a score 1 should be given for equal rating and if a section with empty coaching train has higher weight it should be given towards 10 on the scale.
8	8	9	6	8	1
8	3	2	5	2	1
6	5	3	2	3	1
7	8	9	5	6	1
9	9	9	1	1	1
7	7	8	9	8	1
9	9	9	7	7	9
7	9	9	1	1	9
8	8	9	9	8	8
8	8	9	9	8	9
7	8	9	8	7	4

8	7	8	7	8	8
9	9	9	1	9	9
9	9	1	4	7	1
9	9	9	7	7	1
7	8	8	2	3	1
9	8	6	8	7	7
4	7	4	5	7	6
7	7	7	8	7	1
1	9	9	8	1	1
9	9	9	3	3	1
2	8	7	3	3	6
5	7	7	8	7	1
9	9	9	7	7	1
8	7	7	7	7	1
1	2	1	2	2	1
9	5	9	2	5	9
9	9	9	8	7	1
6	6	7	3	2	1
2	2	2	7	6	7
8	9	9	1	9	9
4	7	7	6	6	6
9	9	9	9	7	4
7	8	7	5	4	3
9	9	8	9	8	5
7	8	8	4	6	6
7	8	8	9	8	1
8	5	8	2	7	6
7	7	6	7	1	4
7	8	9	6	7	3
7	7	6	7	1	4
2	5	7	1	1	2
8	8	8	7	8	7
7	7	7	3	2	8
8	7	7	7	7	3
8	7	7	7	7	3
8	9	9	5	5	5
3	8	8	6	7	7
7	7	7	8	8	1
7	8	8	4	8	6

7	8	6	8	7	8
7	7	8	7	7	6
9	9	9	9	9	9
4	6	8	4	6	4
6	7	8	2	2	1
9	9	9	6	6	1

Section wise Demand based on Historic Data.

Section	ART	ART,CRANE	ART,ARME	ART,ARME,CRANE	ART,ART,ARME,ARME,CRANE,CRANE
DDU-KYT	0	1	0	0	0
KYT-CAR	0	0	0	0	0
CAR-SKGH	0	0	0	0	0
SKGH-RBGJ	0	0	0	0	0
RBGJ-CPU	0	0	0	0	0
CAR-MZP	0	0	1	0	0
MZP-BEO	0	0	0	0	0
BEO-MNF	0	0	0	0	0
MNF-PCOI	0	0	0	0	0
PCOI-LINK	0	0	0	0	0
LINK-SRJ	0	0.5	0.5	0	0
SRJ-MKP	0	0	0	0	0
MKP-CKTD	0	0	0	0	0
NYN-LINK	0	0	0	0	0
PCOI-NYN	0	0	1	0	0
NYN-PRYJ	0	0.5	0.5	0	0
PRYJ-BRE	0	0.333333333	0.666666667	0	0
BRE-KGA	1	0	0	0	0
KGA-FTP	0	0.5	0.5	0	0
FTP-BKO	0	0.25	0.5	0.25	0
BKO-CNB	0	0	0	0	0
CNB-RURA	0.111111111	0.444444444	0.111111111	0.222222222	0.111111111
RURA-PHD	0.4	0.4	0	0	0.2
PHD-ETW	0	0.5	0.5	0	0
ETW-SKB	0	0.5	0.5	0	0
SKB-FZD	1	0	0	0	0
FZD-TDL	0	0	0	1	0
TDL-MTI	0	0.5	0	0	0.5
MTI-BRN	0	0	0	0	0
BRN-HRS	0	0	1	0	0
HRS-ALJN	0	0	0.5	0	0
ALJN-KHURJA	0.333333333	0.444444444	0.111111111	0.111111111	0
KHURJA-GZB	0	0	0	0	0
GZB-NDLS	0	0	0	0	0
BRN-ETH	1	0	0	0	0
ETW-MNQ	0	1	0	0	0

SKB-MNQ	0	0	0	0	0
CNB-BZM	0	0	0.5	0	0.5
BZM-RPGU	0	0	0	0	0
RPGU-PHN	0	0	0	0	0
PHN-ATA	0	0	0	0	0
ATA-ORAI	1	0	0	0	0
ORAI-AIT	0	0	1	0	0
AIT-MOTH	0	0	0	0	0
MOTH-CGN	0	0	0	0	0
CGN-JHS	0	0	0	0	0
JHS-NEW	0	0	0	0	0
NEW-MRPR	1	0	0	0	0
MRPR-GTI	0	0	0	0	0
GTI-MBA	0	1	0	0	0
MBA-KID	0	0	0	1	0
KID-BANDA	0	0.333333333	0	0.666666667	0
BANDA-ATE	0	0	0	0	1
ATE-CKTD	0	0	0	1	0
TDL-MTI	0	0	0	0	0
TDL-ETUE	0	0	0	0	0
ETUE-JAB	0	0	0	0	0
JAB-AF	0	0	0	0	0
ETUE-MTI	1	0	0	0	0
AGC-BHA	0	0.333333333	0.333333333	0.333333333	0
BHA-JJ	0	1	0	0	0
AF-IDH	0	0	0	0	0
IDH-BTE	0.5	0	0	0.5	0
AH-BTE	0	1	0	0	0
BTE-NBI	0	0.5	0.5	0	0
NBI-GOS	0	0	0	0	0
GOS-KPO	0	0	0	0	0
KPO-BKI	0	0	0	0	0
BKI-JP	0	0	0	0	0
BKI-AWR	0	0	0	0	0
MTJ-AH	0	0	0	0	0
IDH-AH	0	0	0	0	0
AH-BTE	0	0	0	0	0
BTE-BXN	1	0	0	0	0
IDH-AGC	0	0	0	0	0
JAB-AGA	0	0	0	0	0
AGA-RKM	0	0	0	0	0

AH-MTJ	0	0	0	0	0
MTJ-BTE	0	0	0	0	0
BTE-BXN	0	0	0	0	0
IDH-FTS	0	0	0	0	0
DHO-MHF	0	0	0	0	0
MHF-TPO	0	0	0	0	0
MHF-SRMT	0	0.5	0	0	0.5
DHO-MRA	0	0	0	0	0
MRA-GWL	0	0.5	0.5	0	0
JHS-BAB	0	0	0	0	0
BAB-LAR	0	0	0	0	0
LAR-MXS	0	0	0	0	0
MXS-BINA	0	0	0	0	0
LAR-TKMG	0	0	0	0	0
TKMG-ISHN	0	0	0	0	0
ISHN-KURJ	0	0	0	0	0
KID-IGTA	0	0	0	0	0
IGTA-HAR	0	0	0	0	0
HAR-GTM	0	0	0	0	0
GTM-BZM	0	0	0	0	0
MBA-SDPM	0	0	0	0	0
SDPM-KURJ	0	0	0	0	0
KURJ-ISHN	0	1	0	0	0
ISHN-TKMG	0	1	0	0	0
GWL-DBA	0	0	1	0	0
DBA-DAA	0	0	0	0	0
DAA-JHS	0	0	0	0	0
GWL-MLAR	0	0	0	0	0
MLAR-SCN	0	0	0	0	0
SCN-BIX	0	0	0	0	0
BIX-UDMR	1	0	0	0	0
UDMR-ETW	0	1	0	0	0
GWL-MRA	0	0	1	0	0
MRA-DHO	0	0	0	0	0
DHO-JJ	0	1	0	0	0
RKM-AGC	0	0	0	0	0
RKM-FTH	0	0	0	0	0
FTH-MTJ	0	0	0.5	0	0
MTJ-BRBD	0	1	0	0	0
BRBD-HDL	0	0	0	1	0
HDL-PWL	0	0	0	0	0

PWL-NDLS	0	0	0	0	0
MTJ-GDO	0	0	1	0	0
GDO-DEEG	0	0	0	0	0
DEEG-BINR	0.666666667	0.333333333	0	0	0
BINR-JBS	0	0	0	0	0
JBS-OTD	0	0	0	0	0
OTD-AWR	0	0	0	0	0
AF-IDH	0	0	0	0	0
IDH-AGC	0	0	0	0	0
IDH-FTS	0	0	0	0	0
FTS-DXH	0	0	0	0	0
DXH-BXN	0	0	0	0	0
AH-MTJ	0	0	0	0	0
AWR-JP	0	0	0	0	0

Publications out of the thesis work

Journals:

1. Tripathi, G., Tanksale, A. N., & Verma, M. (2022). Safety Science. *Safety Science*. **Optimal location of accident relief facilities in a railway network.**
2. **Tripathi G., Lakshay (2024) *Journal of Scientific & Industrial Research* 83 761-771**
Optimizing Strategic Placement of Railroad Accident Relief Equipment: A Simulation-Based Decision Tool DOI: [10.56042/jsir.v83i7.7693](https://doi.org/10.56042/jsir.v83i7.7693)

Other Contributions (Conferences, Book Chapter and Journal):

- Presented paper in AORBI 2021-**International Conference on Applications of Operational Research in Business and Industries.**
- Tripathi, G., Tanksale, A. N.(2023) **A Decision Support System for Supplier Selection in Public Procurement: A Case of Banaras Locomotive Works, Varanasi**
DOI: [10.1007/978-981-19-8012-1_6](https://doi.org/10.1007/978-981-19-8012-1_6) (In book: Applications of Operational Research in Business and Industries)
- A.Kumar, Tanksale A.N., Tripathi G., (2023) **Developing Decision Support System for Crew Planning Problem: A Case of Mumbai Suburban Railway Network**
DOI: [10.2139/ssrn.4436291](https://doi.org/10.2139/ssrn.4436291).

CURRICULUM VITAE

Mr. Gyanesh Tripathi belongs to the 'Indian Railway Service of Mechanical Engineers' (Indian Engineering Service exam batch-2000). He graduated from the National Institute of Technology, Silchar (formerly REC-Silchar) in 1996, and got a degree in Mechanical Engineering.

With over 27 years of experience in the industry, including approximately 24 years with Indian Railways, he has accumulated extensive technical and administrative experience. He has occupied various prestigious posts at different levels of hierarchy in the department like Senior Divisional Engineer, at Agra and Allahabad in North Centre Railways. Deputy Chief design engineer, Chief Quality assurance manager, Chief locomotive Engineer and Chief safety Officer in BLW, Varanasi and Additional Divisional Railway Manager, Varanasi, North Eastern Railways.

Throughout his career, he has successfully completed numerous prestigious and critical projects of national and international significance.

In collaboration with industry partners, he played a pivotal role in indigenizing various critical components of rolling stock, resulting in significant savings for the exchequer and generating local employment.

To mention a few, he contributed to the complete design and development of air conditioning equipment for diesel locomotives in Indian Railways. Indigenisation of components like TA, TM, DBR fan and motor arrangement are few larger components worth mentioning.

As the Deputy head of the production department at BLW-Varanasi, he oversaw the prestigious project of converting diesel locomotives to electric locomotives, which was completed successfully in record time. This project was inaugurated and applauded by the Hon'ble Prime Minister of India, Shri Narendra Modi.

He also led a team of engineers on international assignments for commissioning locomotives supplied to Myanmar and Sri Lanka's railways under a line of credit from the Government of India.

He has undergone extensive national and international training, including specialized training in locomotive design at the 'GE Research Centre' Erie, PA, USA. Advanced management training at INSEAD Singapore, and at 'The ICLIF Leadership and governance Centre' Kuala Lumpur, Malaysia

Currently he is posted as General manager at Centre for Railway Information Systems, Ministry of Railway, New Delhi.