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ncrtc
national capital region transport corporation

Regional Rapid Transit System in National Capital Region (NCR) of India

Overview of Project Monitoring Platform 'SPEED'

OCTOBER 2023

NCRTC: Joint venture between Government of India (GoI) & State governments is implementing India's first semi-high speed regional rail

Inadequate regional mobility in NCR is constraining growth

Unmanageable Urban Sprawl
- Lacking regional Public Transport – low frequency, lack of integration – Multiple interchanges

Pollution
- 40% increase in vehicular pollution – 2010 & 2018
- Road vehicles contribute as high as 41% of the pollution

Congestion
- Vanishing off-peak hours
- 63% share of Private Transport

Accidents
- In 2019 – highest # of deaths in Delhi – 1463 (highest among cities with 50 million plus population)*

RRTS is a key strategic intervention of government & is being implemented by NCRTC

NCRTC
- NCRTC was incorporated in 2013
- 3 prioritized corridors
  - Delhi – Meerut (82km)
  - Delhi – SNB (107Km)
  - Delhi – Panipat (103km)

Regional Rapid Transit System (RRTS)
- Delhi-Meerut corridor was sanctioned in March-2019
- 17Kms section ready for commissioning
- Full corridor commissioning by June-2025

RAPIDX Trains
- RRTS train operation services called RAPIDX
- Separate Ladies Coach
- Dedicated Business Class

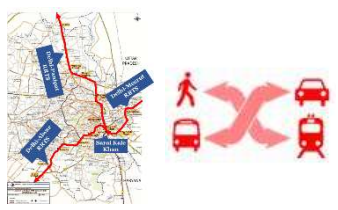
NCRTC – National Capital Region Transport Corporation

RRTS is a Rail based semi-high speed, high-capacity service delivering a comfortable and safe commuter experience

Salient features of RRTS' offerings

Design speed of 180 kmph (Delhi to Meerut-82kms in less than an hour)

Train every ~5-10 min. & serving traffic nodes every 5-10 kms

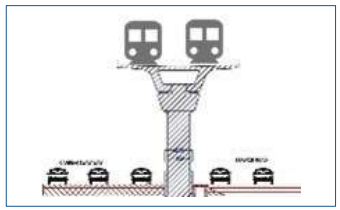


Interoperable Corridors & Multimodal Integration

Universal Access & Dedicated Women Coach

High capacity, comfortable journey, airline seating

Weather-proof from rains, fog etc.



Reduced Land use for high throughput

Commuter friendly information system

RRTS trains will travel at 3 times the average speed of Metro in India

Leveraging Technology for on-time delivery of project

Project Planning & Monitoring Tools

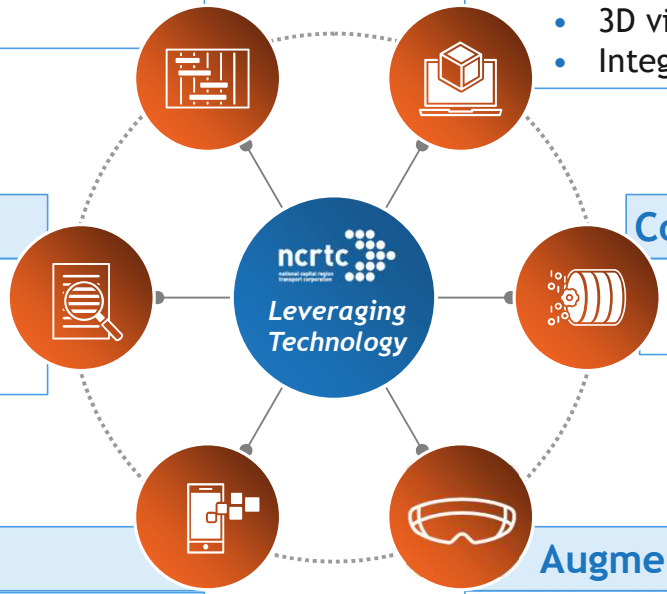
- Primavera P6
- **SPEED (In-House)**

Building Information Modeling (BIM) & GIS

- Collaborative design
- 3D visualisation & Simulations
- Integration with GIS

Documentation

- CCTV/ PTZ Cameras
- Time Lapsed Video
- UAV (Drone)



Common Data Environment (CDE)

- BIM enabled Electronic Document Management System (EDMS)

Mobile Applications

- **Employee attendance (Gati App) (In-house)**
- **Quality Control (QC) App (In-house)**
- RAPIDX Connect

Augmented/Virtual Reality (AR/VR)

- Real-time visualizations
- Team collaboration

Objective for developing an In-house Project Monitoring tool

- **Timely identification and mitigation of potential risks -** mainly involving third parties – creating dependencies with construction activities
- Available tools in the market are more contractor-centric - **lack project owner's perspective**
- **Projects owner** best placed to manage pre-construction risks
- **Customised modules** – improved planning/ scheduling, cost control
- **Enhanced collaboration** and enabling remote working
- Live on-site information to facilitate **decision making**

Identification and managing risks leads to achieving project timelines

SPEED is an enhanced and comprehensive customizable project tool

Systematic Program Evaluation for Efficient Delivery (SPEED)

All important project aspects covered - Pre-construction, Construction, Cost, Meetings, Quality & Safety, etc.

Can be **Integrated** with 3rd party applications like **Common Data Environment (CDE), Power-BI, Primavera, etc.**

Can be **customized** for Buildings, Railways, Highways or any other infrastructure project

Ease of **usability and accessibility - Mobile friendly** user-interface

Ease of working - Can be used effectively by **minimum training**

Caters to project owner's perspective for large infrastructure projects

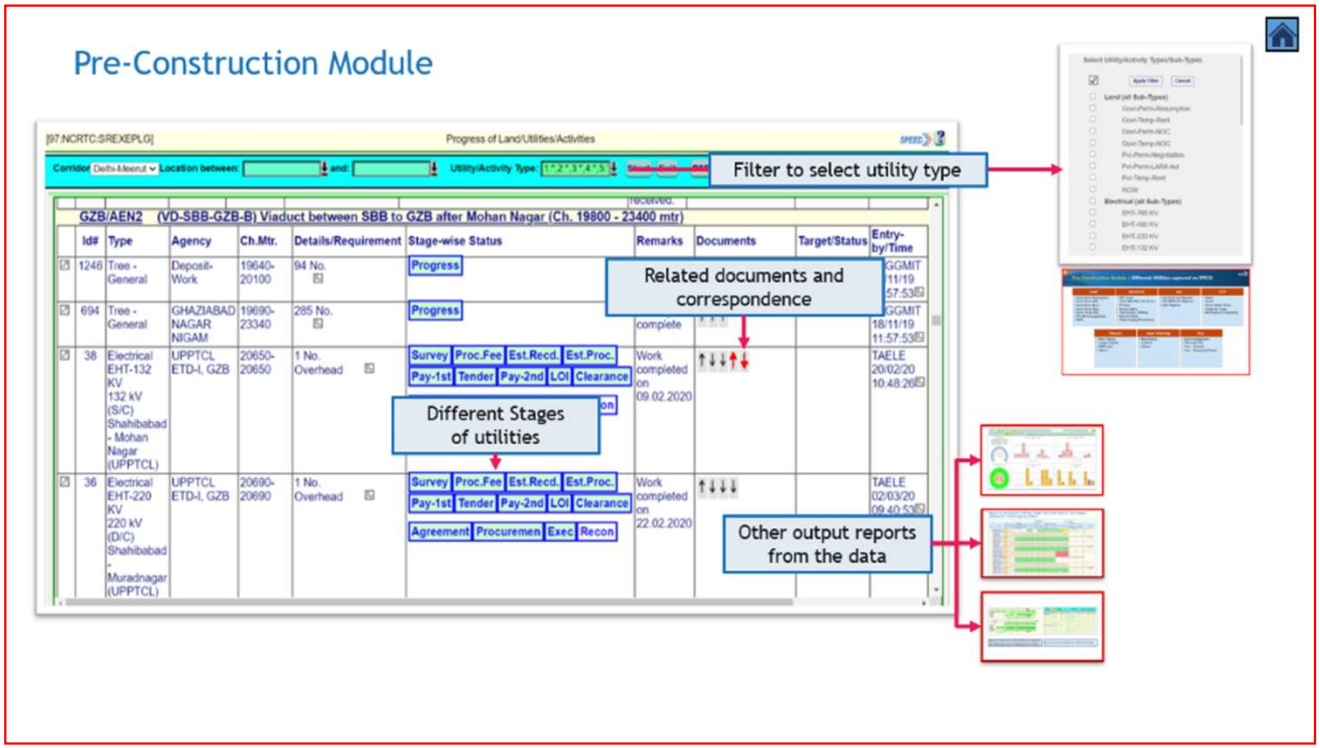
SPEED Key Modules cover the entire horizon of the project management

Project Development		Pre-construction
		Construction
		Quality/Safety/Environment
Finance & Approvals		Cost Monitoring
Operations & Monitoring		Review Meeting
		Progress Reports
		Dashboard
Governance		Employee Self Service (ESS)

Pre-Construction Module | SPEED enables to identify & capture key dependencies with monitorable stages & maintain proper documentation

Requirements of **land/utilities** across the alignment can be captured

Complete **Transparency** & Information sharing

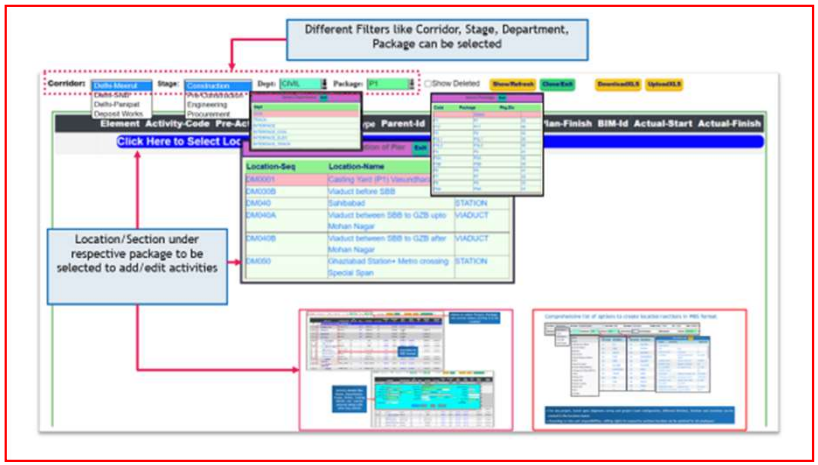


Measurable details like Chainage, Agency, Quantity can be captured

Different activity stages for **proper monitoring**

Construction Module | Monitor the real time status of all construction activities; easy data visualization tools available (1/2)

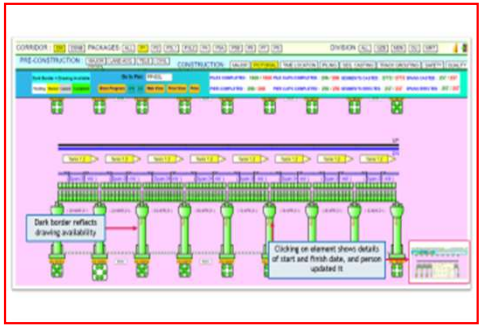
- **Work Breakdown Structure (WBS) -** Monitorable activities of project are created in the form of WBS
- **Activity Detailing** - Associated details like scope, schedule dates, and type of activity like Pre-cast/Cast In-Situ, etc. can be captured
- **Daily progress update - by field offices -** Activities are updated online, directly from field offices
- **Flexible to use & Customizable -** depending on the type of infrastructure project



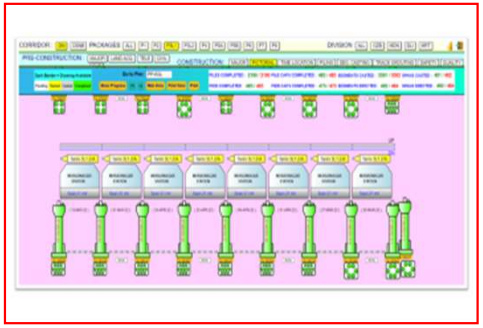
Easy to track construction progress via data visualization

- **Single source of information -** no requirement of physical reports
- **Capture data at minute level** - Drawing Status and Pour Cards are also captured
- **Flexibility to capture different type of output** - based on use-case like package-wise, activity wise, etc.

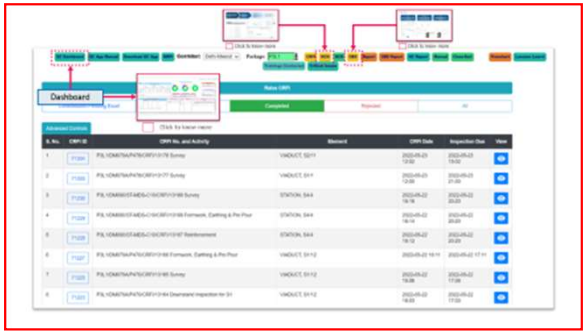
Viaduct

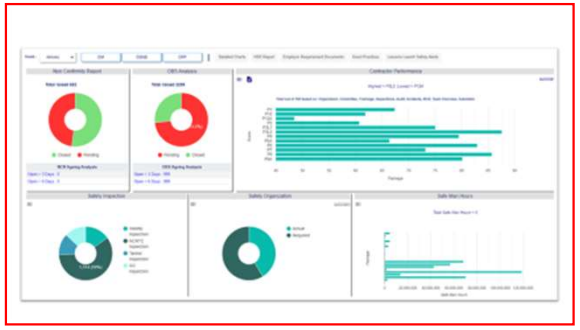


Station



Quality Control & Safety & Environment Status | Single window management of Quality, Safety & Environment





Quality Report:

- Online generation and approval of Request for Inspection (RFI), NCR/NCN, etc.
- Single Window Management
- Transparency in Data

Safety Report:

- Status of safety parameters like NCR, Observations, contractor performance, Mandays worked/lost, Incident count & reports
- Single window for capturing and analyzing safety data for packages/field-office wise

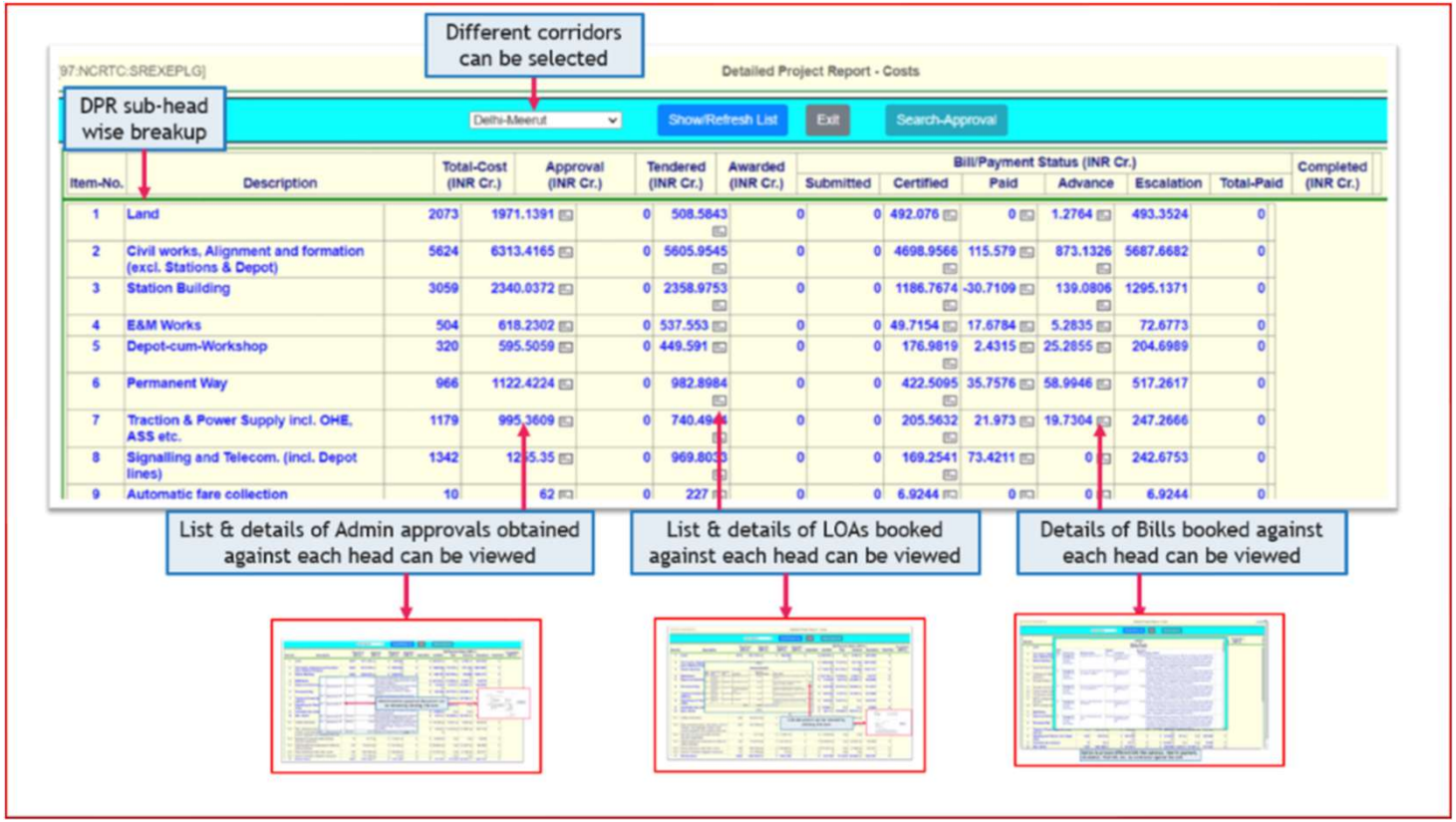
Environment Report:

- Comprehensive dashboard covering major environment parameters
- Status of monitored parameters like PM10, PM2.5, SO2, NO2, etc.
- Status of tree cutting and tree plantation along with survival nos.

NCR – Non-Conformity Report, NCN – Non-Conformity Notice

Cost Monitoring Module | Comparison of Approved / Estimated / Awarded / Actual cost

Item-wise Approved project cost is tracked against various costs



Item-No.	Description	Total-Cost (INR Cr.)	Approval (INR Cr.)		Tendered (INR Cr.)	Awarded (INR Cr.)	Bill/Payment Status (INR Cr.)						Completed (INR Cr.)
							Submitted	Certified	Paid	Advance	Escalation	Total-Paid	
1	Land	2073	1971.1391	0	508.5843	0	0	492.076	0	1.2764	493.3524	0	
2	Civil works, Alignment and formation (excl. Stations & Depot)	5624	6313.4165	0	5605.9545	0	0	4698.9566	115.579	873.1326	5687.6682	0	
3	Station Building	3059	2340.0372	0	2358.9753	0	0	1186.7674	-30.7109	139.0806	1295.1371	0	
4	E&M Works	504	618.2302	0	537.553	0	0	49.7154	17.6784	5.2835	72.6773	0	
5	Depot-cum-Workshop	320	595.5059	0	449.591	0	0	176.9819	2.4315	25.2855	204.6989	0	
6	Permanent Way	966	1122.4224	0	982.8984	0	0	422.5095	35.7576	58.9946	517.2617	0	
7	Traction & Power Supply incl. OHE, ASS etc.	1179	995.3609	0	740.4944	0	0	205.5632	21.973	19.7304	247.2666	0	
8	Signalling and Telecom. (incl. Depot lines)	1342	1235.35	0	969.8033	0	0	169.2541	73.4211	0	242.6753	0	
9	Automatic fare collection	10	62	0	227	0	0	6.9244	0	0	6.9244	0	

End-to-end online process of Estimate approval, LOA Generation & Bill processing

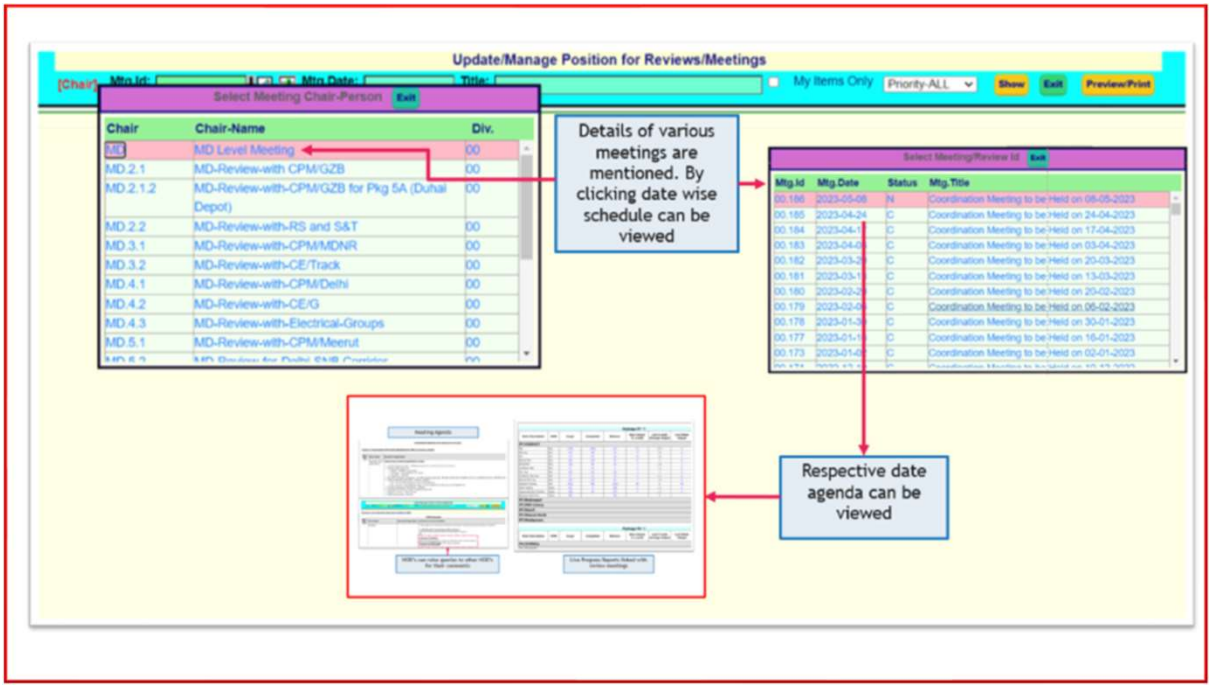
Review Meeting Module | Online Agenda and Minutes of Meeting

- Meetings are decision support system and brings synergy in the organization
- Conducted at various levels like –
  - Weekly MD review meeting
  - Departments meeting
  - Project site meetings

Online live rolling agenda

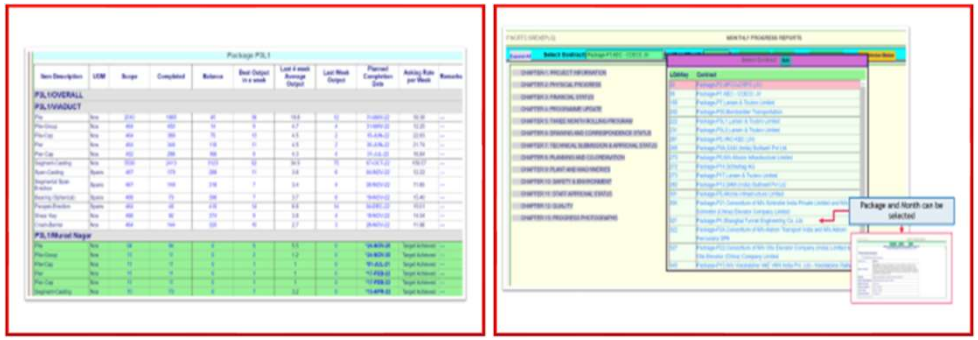
Minutes with auto archiving

Tagging officers for reply



Progress Report & Handing over Module | Modular reports for progress monitoring

Weekly / Monthly Progress Report

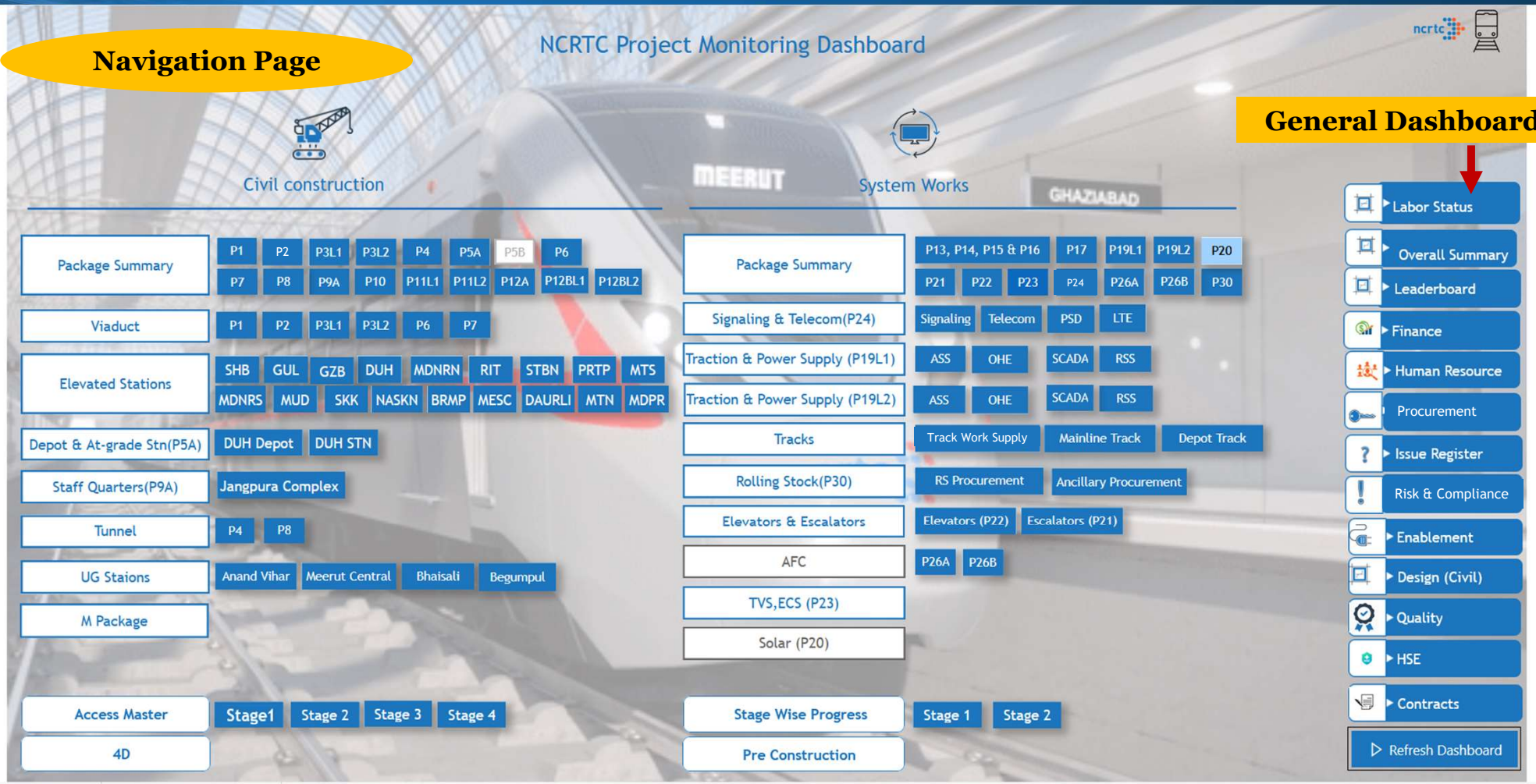


- Comparison of actual progress against Asking Rate along with Best and Last 4-weeks output
- Complete Online Workflow for Submission of MPR by contractor
- Online review by the concerned person

Interface/ Inter-Dept. Handing over

- Notification generated when any stretch is ready for Handing over
- Department wise Handing over and Readiness status visible
- Request forward option to other dept. for inspection and activity takeover

Dashboards | Real-time insights for decision-making & timely interventions

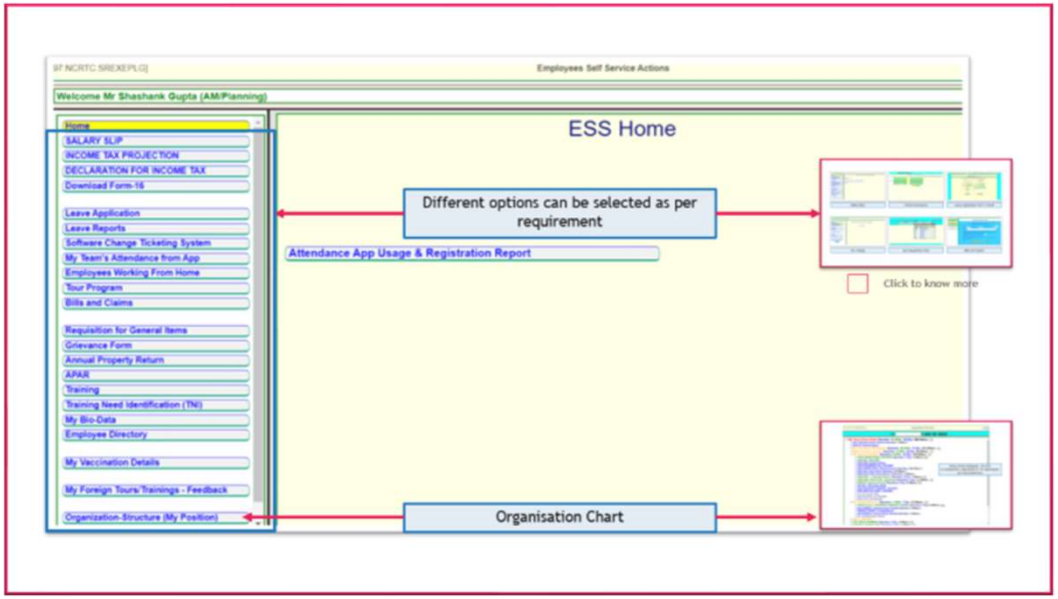


Employee Self Service Module | Empowers employees & brings efficiency & accountability in HR processes

ESS Module - Online Facilities

- Salary slip generation & Income Tax projection
- Annual Performance Appraisal Report (APAR)
- Online attendance system
- Leave Application and Reports
- Employee Bills and Claims
- Requisition for General items

Employee Self-Service (ESS) Module



NCRTC MOBILE APPLICATIONS

GATI App | Custom-made IT solution for HR / Admin activities

Manage Attendance & Leave

AI based Face Recognition

Apply Geo fencing

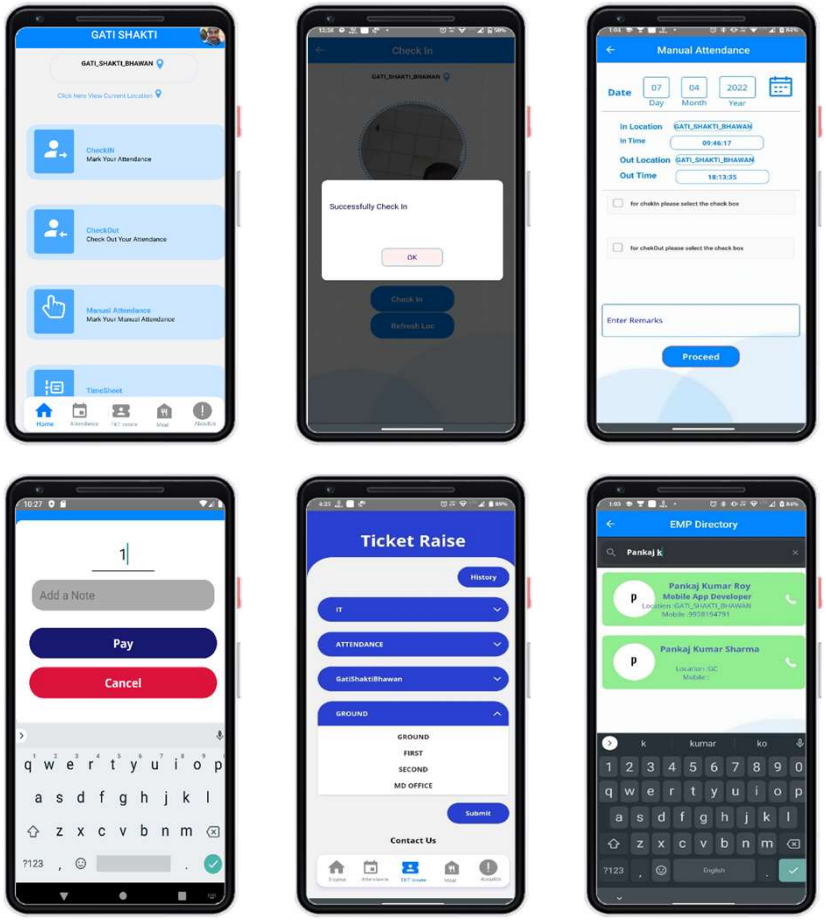
Apply & Approve Leave, WFH

Perform day to day functions from same app

Can make payment in Canteen

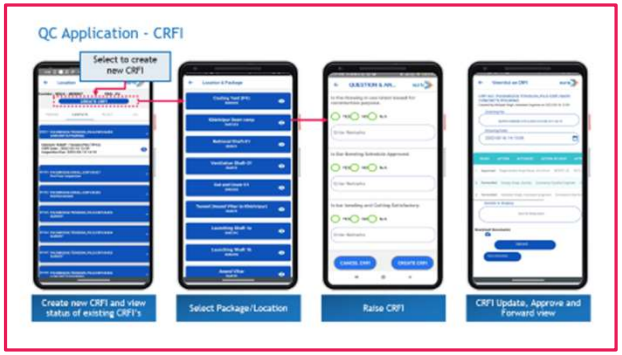
See hospital list and navigate

See Employee directory; raise tickets



QC App | Inspect and review the Quality based on day to day construction management

CRFI (Construction Request for Inspection)



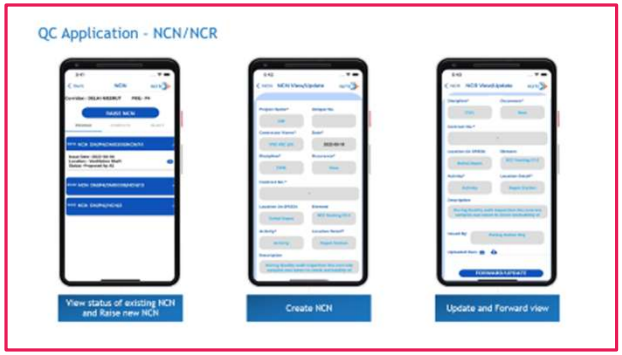
Create new CRFI and view status of existing CRFI's

Select Package/Location

Raise CRFI

CRFI Update, Approve and Forward view

NCN/NCR (Nonconformity Notice/Report)

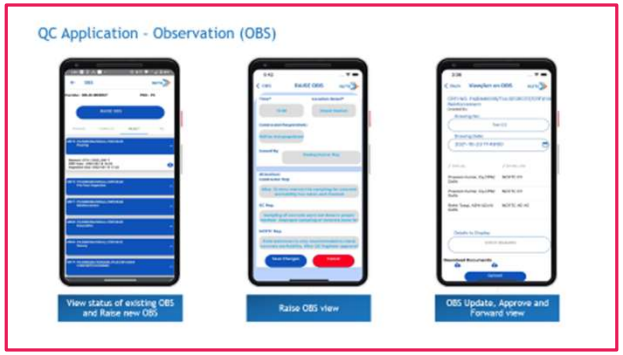


View status of existing NCN and Raise new NCN

Create NCN

Update and Forward view

GC Observation/Inspection



View status of existing OBS and Raise new OBS

Raise OBS view

OBS Update, Approve and Forward view

Technical Stack for SPEED and App | Using the most updated technology enabling use cases across all platforms

	GATI App	SPEED	QC App
Application Type	Native Mobile App	Web Application	Progressive Web Apps
Programming Lang	Java/Kotlin/Swift	PHP/JavaScript	NodeJs
Database	PostgreSQL	PostgreSQL	PostgreSQL
Supporting OS	iOS 11.0 and above Android OS 9.0 to latest	All web-browser support	All web-browser support
Hosting	Compatible with all hyper-scale cloud services		
Designing Tools	Adobe XD, Photoshop CC, Adobe Illustrator CC, Dream Viewer CC, Sketch Design Tool, Invision App Prototype (CC*: Adobe Creative Cloud)		

Quality Tools - Bug Tracking is an integral part of SPEED

We provide various customizable solutions

	Enterprise	Modular
Features/Deliverables	**SPEED with annual subscription & integration**	**Modules of SPEED with annual subscription**
Schedule live demo	Yes	Yes
Access to all modules	All	As per requirement
Integration with other software	Yes	NA
Access to Project Dashboard	Yes	Yes
Training of the workforce	Yes	Yes
Technical Support available	Yes	Yes
Customization as needed	Yes	NA
Access to GATI/QC App	Yes	As per requirement

SPEED has grown in stature over the years | Audit Certificate

- **Audit Certificates – SPEED and Gati App**

SECUREYES
Infusing Security

M/s. SecurEyes Techno Services Pvt. Ltd.
4th Floor, Delta Block, Sigma Soft Tech Park
Whitefield Main Road, Varathur Post,
Bangalore – 560066
CIN Number: U72900KA2006PTC040519

1134

S/N: SETSPL/2023/95

Security Clearance Certificate for " QUIC " Application

Hosting URL	https://www.ncrtc.in/speed
Audit URL	https://staging.ncrtc.in/fcgi/webfrm
Environment Details	Apache 2.4.6, Custom Framework, Cent OS 7, PostgreSQL 10.12
Audited By	Silky
Issuing Date	07th April 2023
Valid Till	06th April 2024 (1 Year)
Audit Duration	09th January 2023 to 06th April 2023

Conclusion

The above site has undergone Security Audit against OWASP standard and has been found safe from known web vulnerabilities with 15 accepted risks.

Recommendations

1	Site's **'/var/www/frm'** folder must be hosted with the 'Read' permissions.
2	The application's **'/var/www/frm'** folder is to be deployed over SSL.
3	Web server and OS level hardening need to be in place for the production server.
4	Directory browsing should be disabled.
5	The application should connect with the database using a low privileged database user having minimum required database privileges
6	Default and sample applications should be removed from the web server.
7	The uploaded files are stored in the Database.
8	The application should be upgraded to the latest stable version of Apache during production deployment.
9	Credentials used during testing should be mandatorily changed in the production environment.
10	SSL/TLS Certificate should be implemented when the website is deployed in the production environment.

Disclaimer

This certificate is valid for the period during which the audit was carried out and is subject to audit limitations and relies on stakeholders' assurance provided to us for certain areas as mentioned in the final level report. This is also based on the information and the state of website contents provided for final level audit. Projection of any conclusions based on our findings for future periods and application versions is subject to the risk that the validity of such conclusions may be altered because of changes made to the application or system or the failure to make the changes to the system when required.

Note

As per the audit policy, it is essential to refer the website for re-audit on addition/modification of any dynamic content.

Place: Delhi
Date: 07 April 2023

[Authorized Signatory]

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SecurEyes Techno Services Pvt. Ltd.
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Bangalore - 560037

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Whitefield Main Road, Varathur Post,
Bangalore – 560066
CIN Number: U72900KA2006PTC040519

1130

S/N: SETSPL/2023/103

Security Clearance Certificate for " GATI iOS " Application

Hosting Build Name	Gati
Audit Build Name	AttendanceApp.ipa
Environment Details	Android, Apache 2.4.6, PostgreSQL 10.12, React Native, JavaScript
Audited By	Sweta Mohanty & Silky
Issuing Date	07th April 2023
Valid Till	06th April 2024 (1 Year)
Audit Duration	09th January 2023 to 06th April 2023

Conclusion

The above site has undergone Security Audit against OWASP standard and has been found safe from known web vulnerabilities with 08 accepted risks.

Recommendations

1	Site's **'/var/www/frm'** folder must be hosted with the 'Read' permissions. 'Execute' permission is not to be given to the application.
2	Site **'/var/www/frm'** folder is to be deployed over TLS v1.2 or TLS v1.3
3	SSL Pinning should be enabled for the android build.
4	Web Server and OS level hardening need to be in place for the production server.
5	The application should connect with the database using a low privileged database user having minimum required database privileges.
6	Default and sample applications should be removed from the web server.
7	The uploaded files are stored in the to **'/home/PDF/PHOTO'** folder which must be enabled with 'Read' & 'Write' Permissions. 'Execute' Permission should not be granted to this folder.
8	Credentials used during testing should be mandatorily changed in the production environment
9	The application should be upgraded to the latest stable version of Apache during production deployment.

Disclaimer

This certificate is valid for the period during which the audit was carried out and is subject to audit limitations and relies on stakeholders' assurance provided to us for certain areas as mentioned in the final level report. This is also based on the information and the state of website contents provided for final level audit. Projection of any conclusions based on our findings for future periods and application versions is subject to the risk that the validity of such conclusions may be altered because of changes made to the application or system or the failure to make the changes to the system when required.

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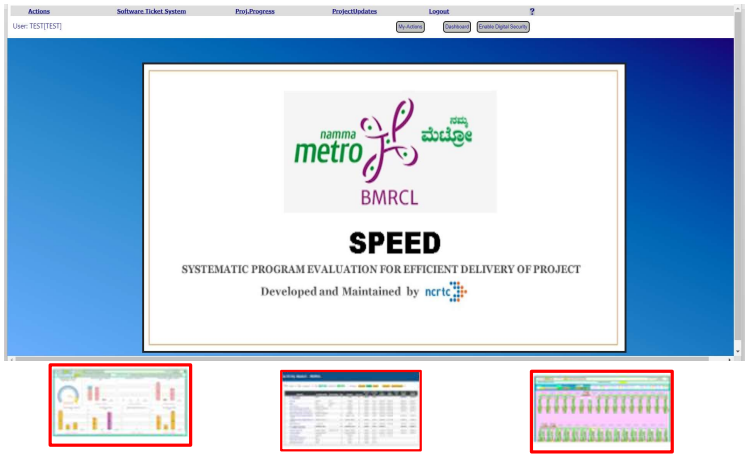
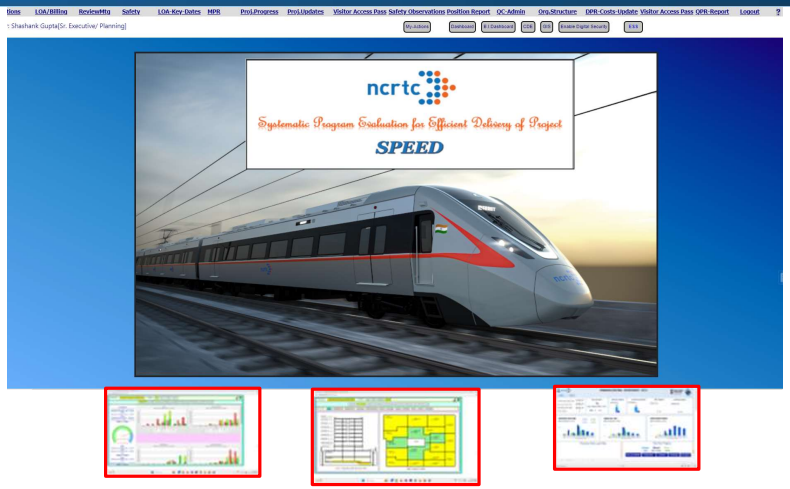
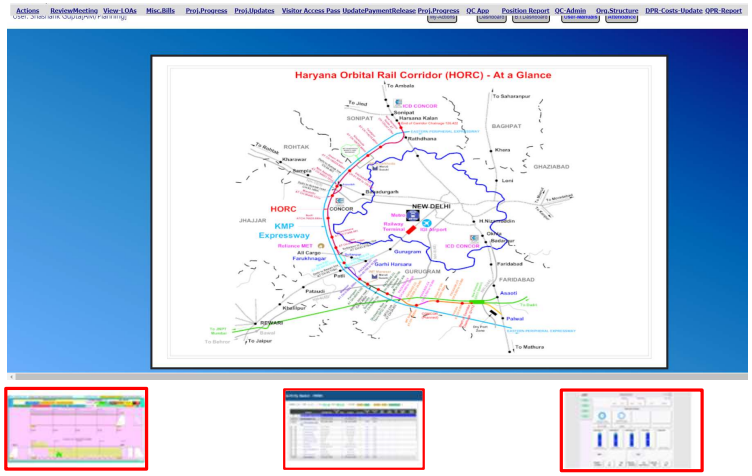
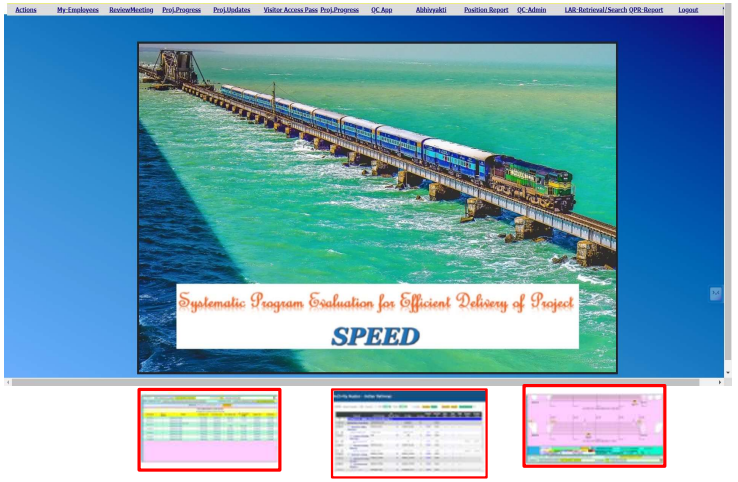
www.secureyes.net

SPEED has been recognized as one of the best tools in the Indian market









Team behind the success of SPEED

Idea

Concept

Coordination

Implementation Team

Vinay Kumar Singh
MD/NCRTC

Rajaram Prasad
GGM/IT

Rajat Gosain
GGM/Planning

GM/IT

DGM/Planning

SPEED Experts

Power BI Experts

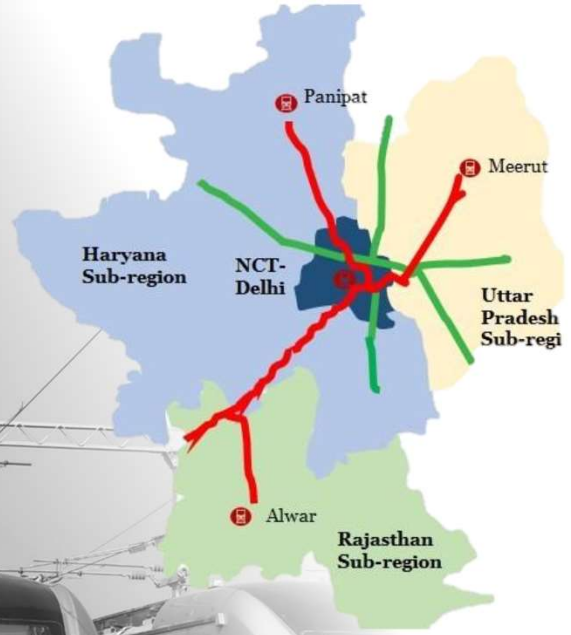
Planning Experts

गति से प्रगति

Thank You

ncrtc
national capital region transport corporation

National Capital Region Transport Corporation, GatiShakti Bhawan,
INA, New Delhi – 110023
Website: ncrtc.in



For queries:

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rajat.gosain@ncrtc.in