TMS
TRACK MANAGEMENT SYSTEM

Management Information System (Asset Management)

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Director (TMS)

TMS
Track management System for Indian Railways

Track Asset

- 1,13,617 km track on 63,974 km route length
  - Formation
  - Ballast
  - Sleeper
  - Rail
  - Fastening System

INDIAN RAILWAYS

Track Asset – Special Features

- Turnouts (86,184)
- Other Joints (Welds, Fishplates, etc.) – 30 million (approx.)
- Level crossings – 33,553 (one LC at every 2 km)
- Bridges – 1,31,205 (two bridges in every km)

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Resources Deployed in Track Maintenance

- Officials deployed in track maintenance
  - Junior Engineers - **3774**
  - Section Engineers - **2418**
  - Sub Divisional Engineer - **571**
  - Superintending Engineers - **368**

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Why asset Management System?

Where is the report of this ***fracture***?

Who is *responsible* for this ***weld***?

What is the *utilization* of this ***machine***?

Where is the proposal?

What is the *status* of this ***work***?

Where is the *machine to be* ***deployed***?

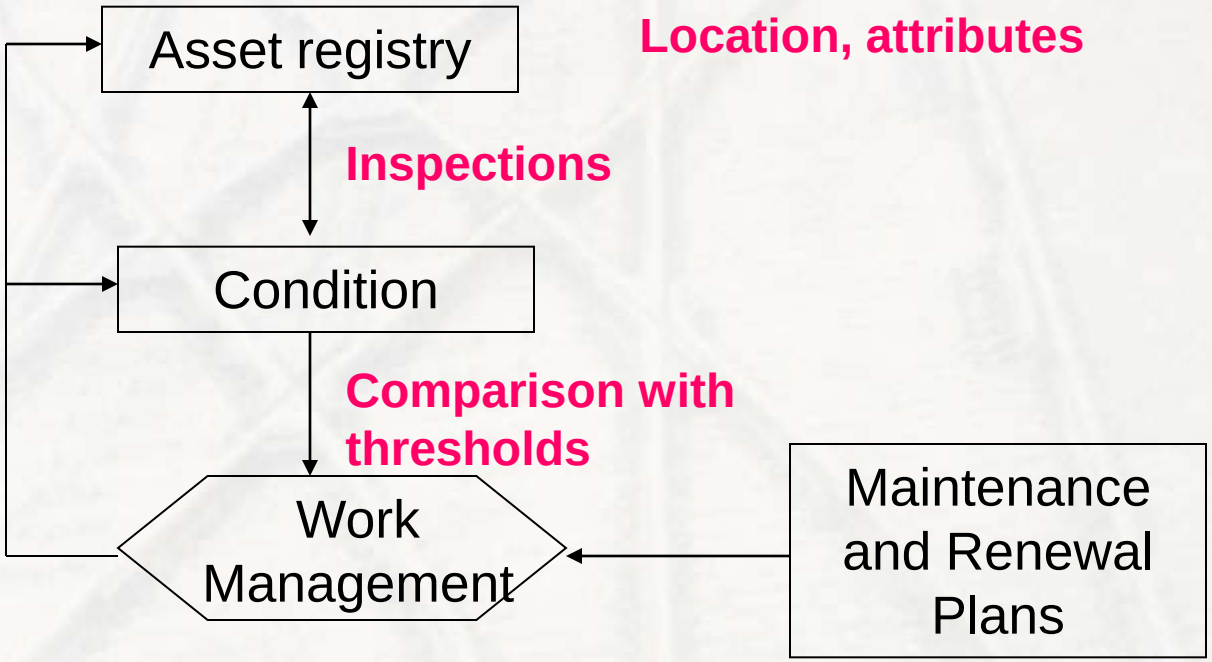
What is the total *cost* of maintenance?

For maintaining, upgrading, and operating physical assets cost effectively, based on a continuous physical inventory and condition assessment.

Current Challenges

- ⚠ **Manual Monitoring of Railway asset is time consuming**
- ⚠ **No validation checks on data collected**
- ⚠ **Paper records difficult to maintain and retrieve.**
- ⚠ **asset maintenance is reactive not proactive**
- ⚠ **Man hours consumed in manual procedure**
- ⚠ **Lack of reliable and timely data for the management to make intelligent business decisions**
- ⚠ **No forecasting possible to maintain spares inventory or deploy resources in a planned manner**
- ⚠ **Time lag between capturing the data and getting it to the management for decision making**

Managing Physical assets



Inventory – What do I own?

Need data on any feature that influences:

- Cost to Replace or Maintain
- Maintenance Treatment Options
- Influences Management Decisions
- Service Life

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Condition– What Shape is it In?

Sustainable :

- Can I afford to collect the data?
  - Can my staff collect that data or do I have to hire it out?
  - Can I collect enough data to give me suitable information?

Be descriptive about the asset

- Can I make decisions about the asset from the rating?
- Can it be understood by staff?
- Is the level of data appropriate?

Maintenance State "Good – Fair – Poor"

Work Management

- “When to do things”
- “What things to do”
- “How did that treatment/design work?”
- “Are things getting better or worse?”

INDIAN RAILWAYS

Management Systems Adoption

In order for a system to be valued and have longevity it must do the following:

- Be part of the agencies business practice,

AND

- Work to make a necessary business practice easier,

AND

- The time spent supporting the system must be less that the value it provides.

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Solution Architecture

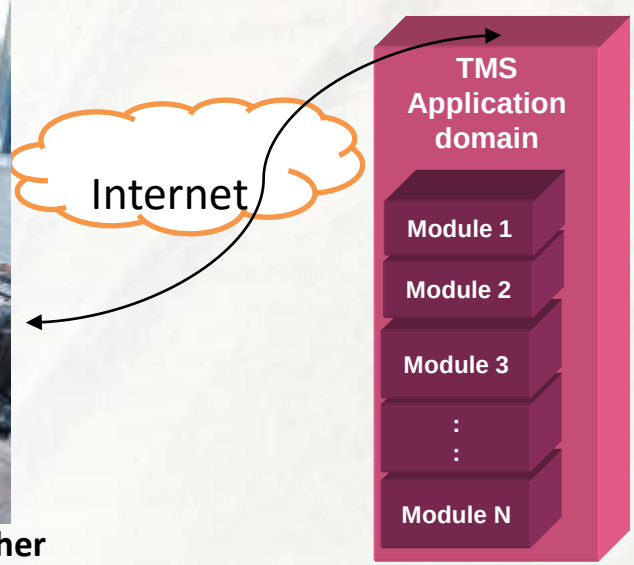
- Field users do track Inspection Online or offline
- Data quality is validated at the source
- Secured & Role based access to the TMS application

TMS Application

- Asset Management
- Rail & Weld Fracture
- Track Monitoring by Machines
- Maintenance by Machines & USFD Testing
- Engineering Control-Caution Orders and Traffic Blocks
- Track Renewal & Deep screening
- Ballast Supply and Insertion
- Patrolling & Accidents Reporting
- Inventory Management including P-Way Scrap

- Senior management gets validated linear asset data up to date at all times
- Proactive Maintenance Management can be undertaken
- Faster turn around from data capture to corrective actions taken.
- Transparency in Operations

Netbooks to PWIs and other engineers for conducting Track Inspections



Central server at CRIS Data Centre

Zonal/Divisional Offices with Management Users

Deployment View

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TRACK MANAGEMENT SYSTEM

Opening Login Page

Login Page - Track Management System - Windows Internet Explorer

https://ircep.gov.in/TMS/

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TRACK MANAGEMENT SYSTEM

रेलपथ प्रबंधन प्रणाली

Welcome to TMS

Thanks for being an important part of us

Internet Explorer 7 or above is recommended

USER LOGIN AREA

Login to access application

Username type your username

Password

SUBMIT

last update on: 03/09/2011, 20:00

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Designed & Developed by CRIS

Done

Internet | Protected Mode: On

100%

Start

12:50
04-09-2011

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SSE/Pway's Screens

TMS
TRACK MANAGEMENT SYSTEM

SSE/Pway's Screens

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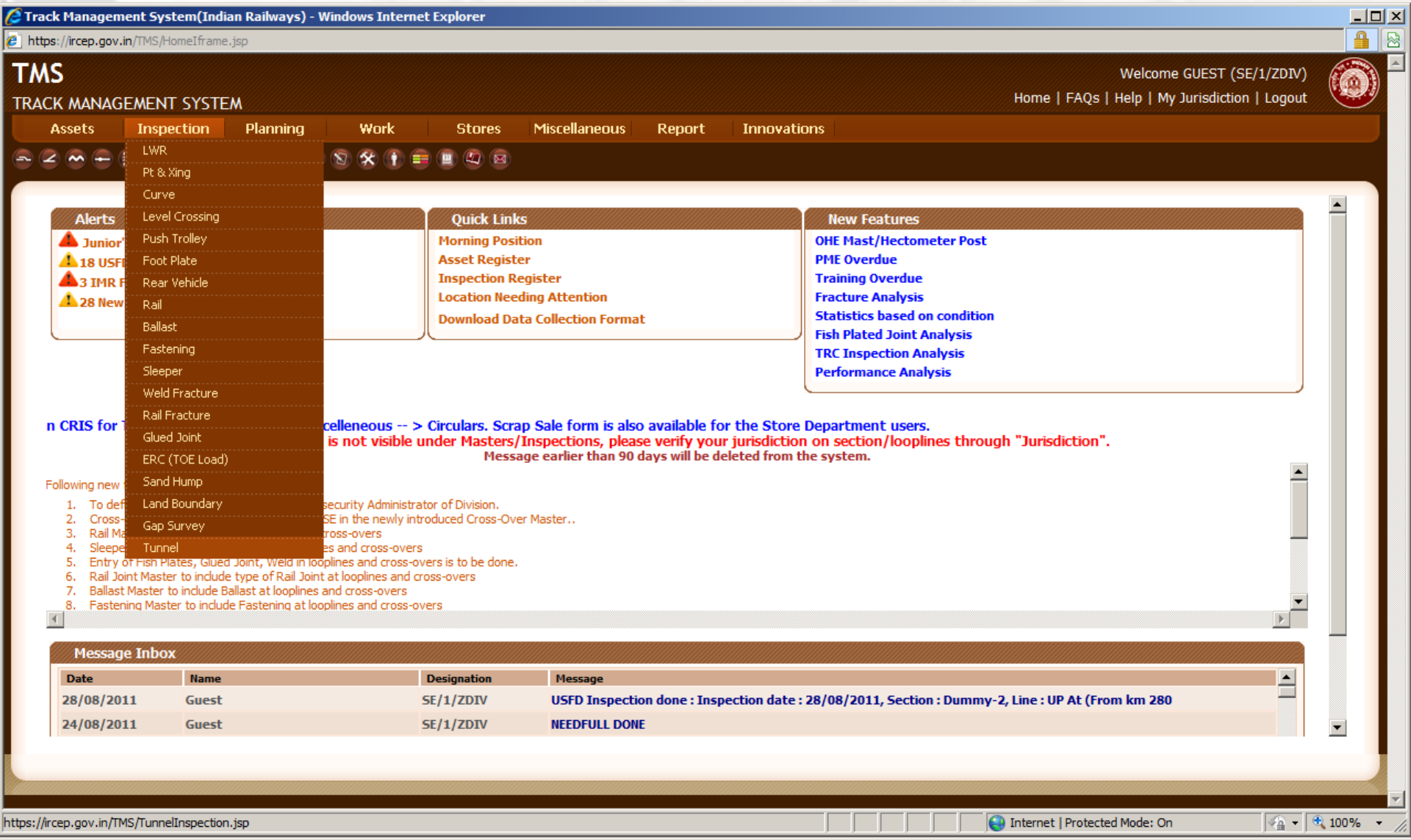
SSE/Pway's Screens



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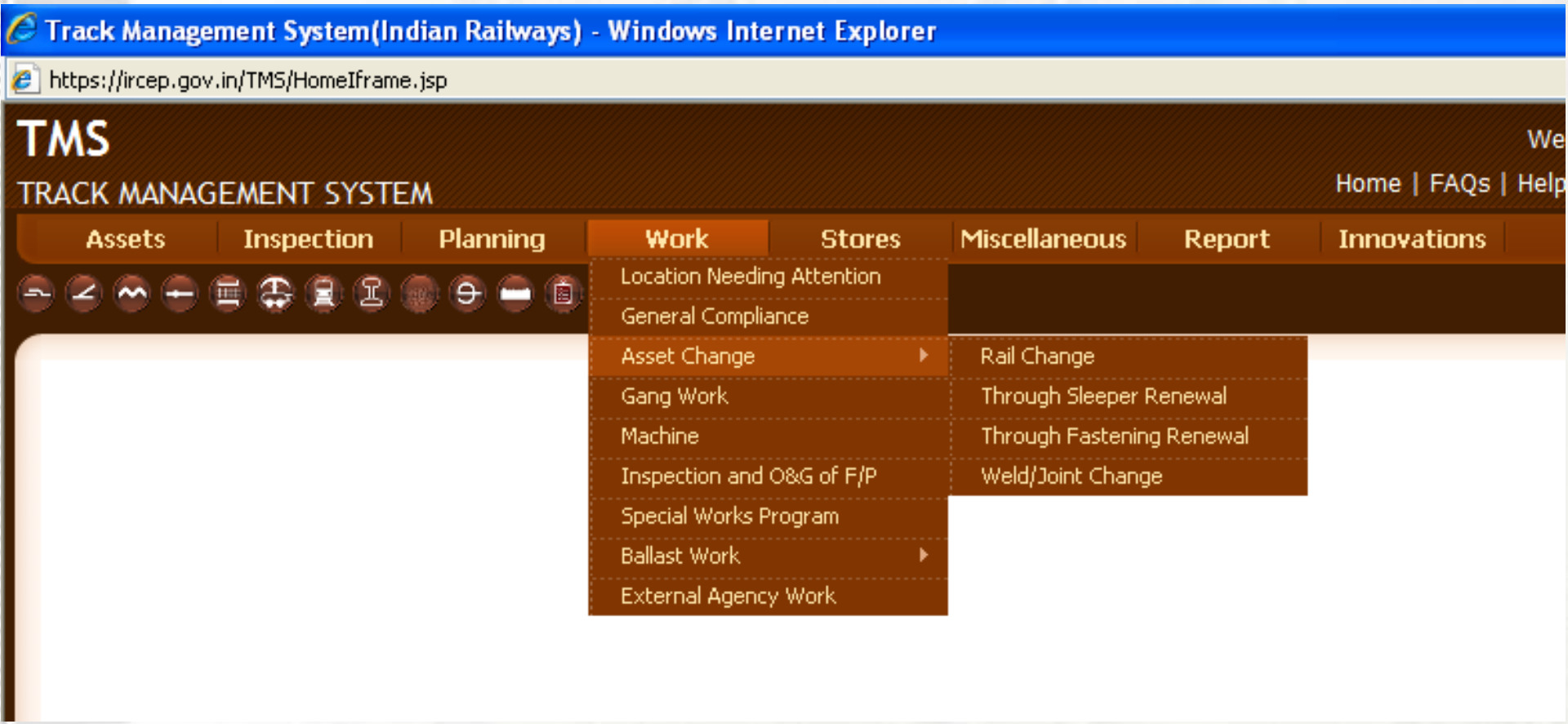
SSE/Pway's Screens



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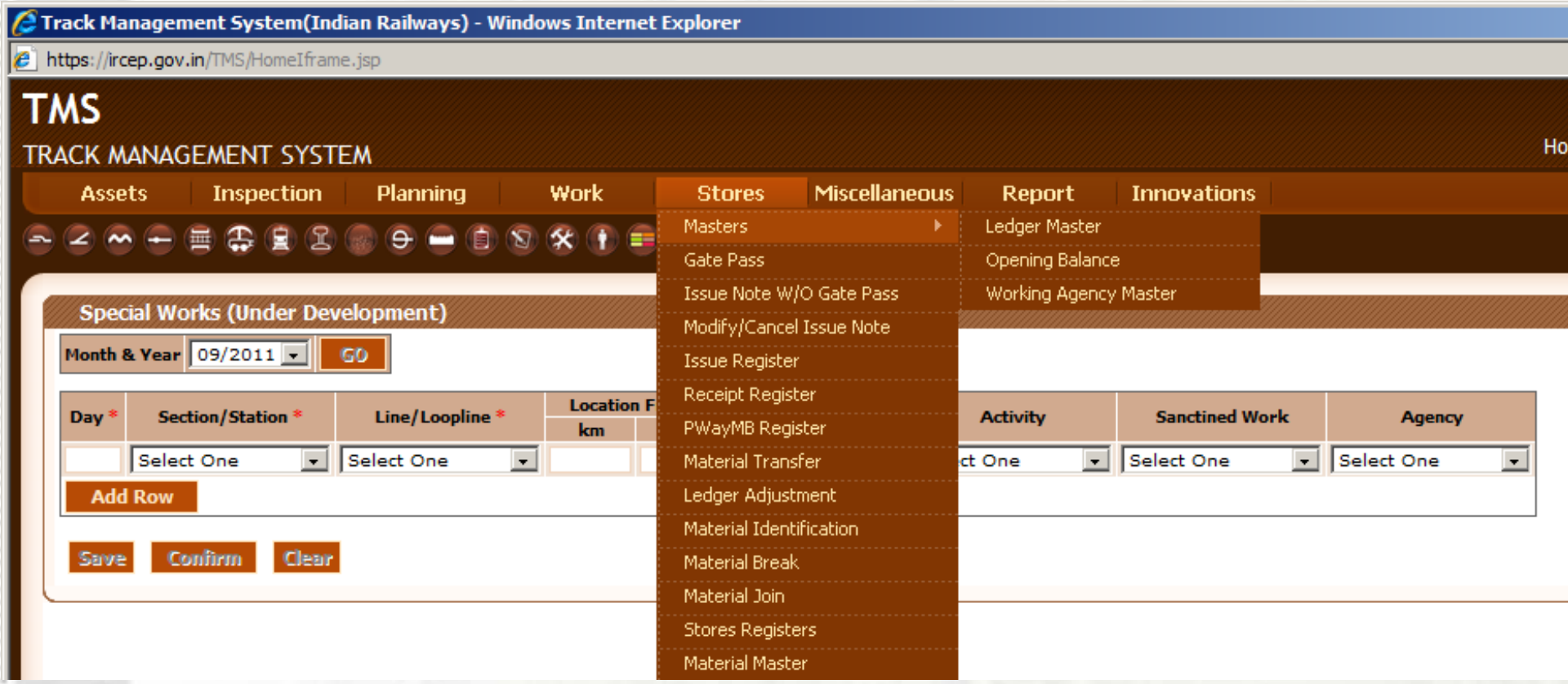
SSE/Pway's Screens



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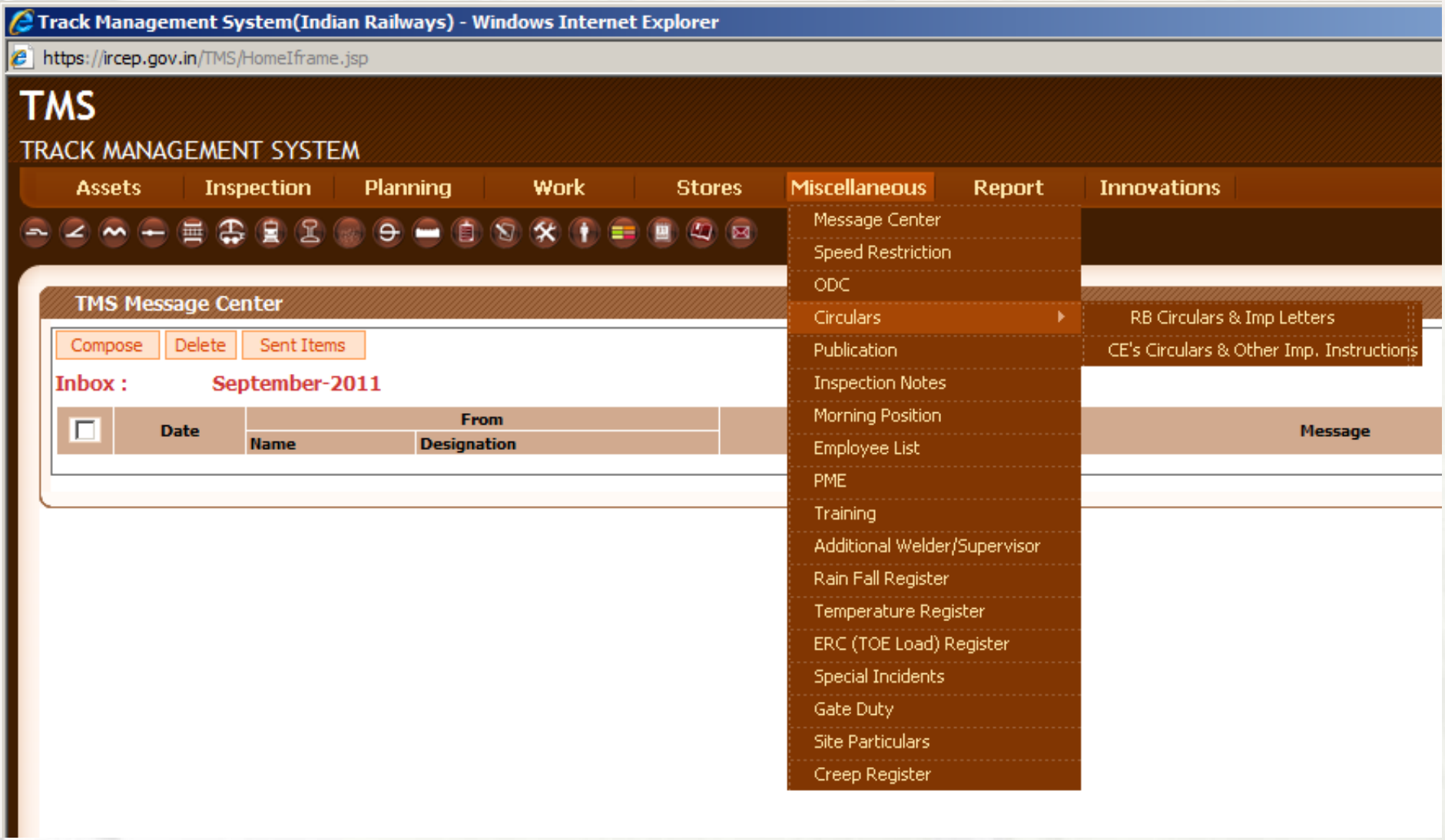
SSE/Pway's Screens



Reports

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Inspection | Miscellaneous | Report | Innovations | PCDO | Purchase Order

- Track Network
- Asset Register
- Inspection
  - Inspection Register
  - Inspection Analysis
  - Offline Inspection Analysis
- Fracture Analysis
- Track Diagram
- TRC
- OMS
- USFD
- Gang Work
- Miscellaneous Register
- Scrap Reports
- Gang Usage
- User Analysis
- Location Needing Attention
- Machine Progress
- Machine Progress Summary
- Compliance
- Rain Fall Register
- Temprature Register
- User Performance
- Turnout Statistics
- Material Under Trial
- Material Master
- Technical Suggestion
- Engineering Control
- Land Management
- Purchase Order

Alerts

Analysis
Attention
ollection Format

New Features

ME Overdue
Training Overdue
Statistics based on condition
Fish Plated Joint Analysis
Performance Analysis

ble in Miscelleneous -- > Circular
lable for the Store Department users.
an 90 days will be deleted from the system.

A. Provision to upload CE's Circu
B. All the Mini laptops have co
be done by starting the Mc
crashed and the consequen
Guidelines are Available unde

s available under Miscellaneous -- > Circulars > CE's Circular & Other Important Instructions
ded. However, for automatic updates the same has to be registered with McAfee. This c
link for registering. A valid email is required for this purpose. In the event of the OS gettir
McAfee antivirus needs to be reloaded and if necessary re registered. Details of Maintenan

Message Inbox

Date	Name	essage
13/10/2011	Cris Admin	e operating station Muri will come when you select the option "yes" for "Whether vided with tel
13/10/2011	Cris Admin	e same have been corrected. (CRIS Admin Team)
13/10/2011	Cris Admin	e same has been corrected. (CRIS Admin Team)

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Innovations & Technical Suggestions

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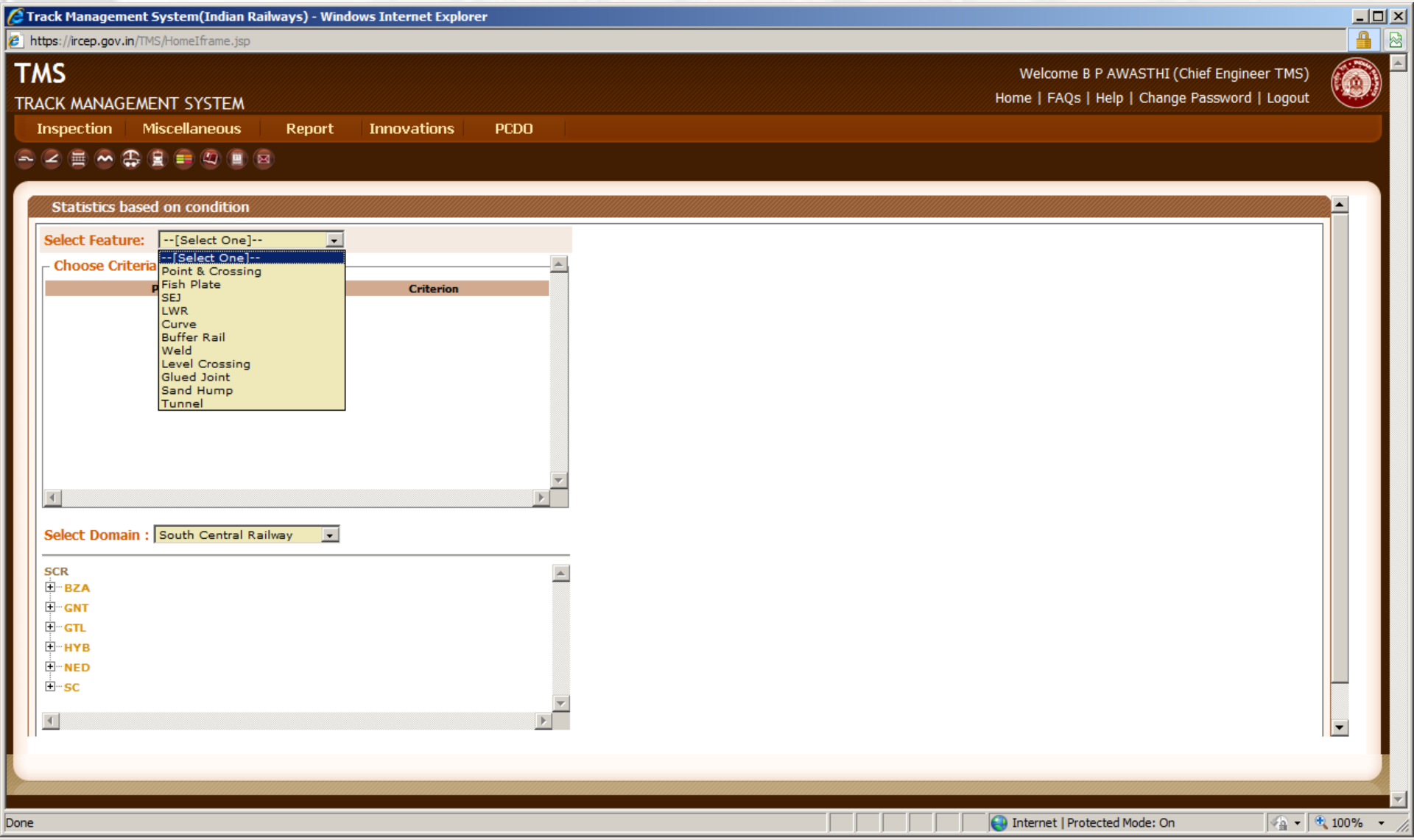
Statistics based on Condition



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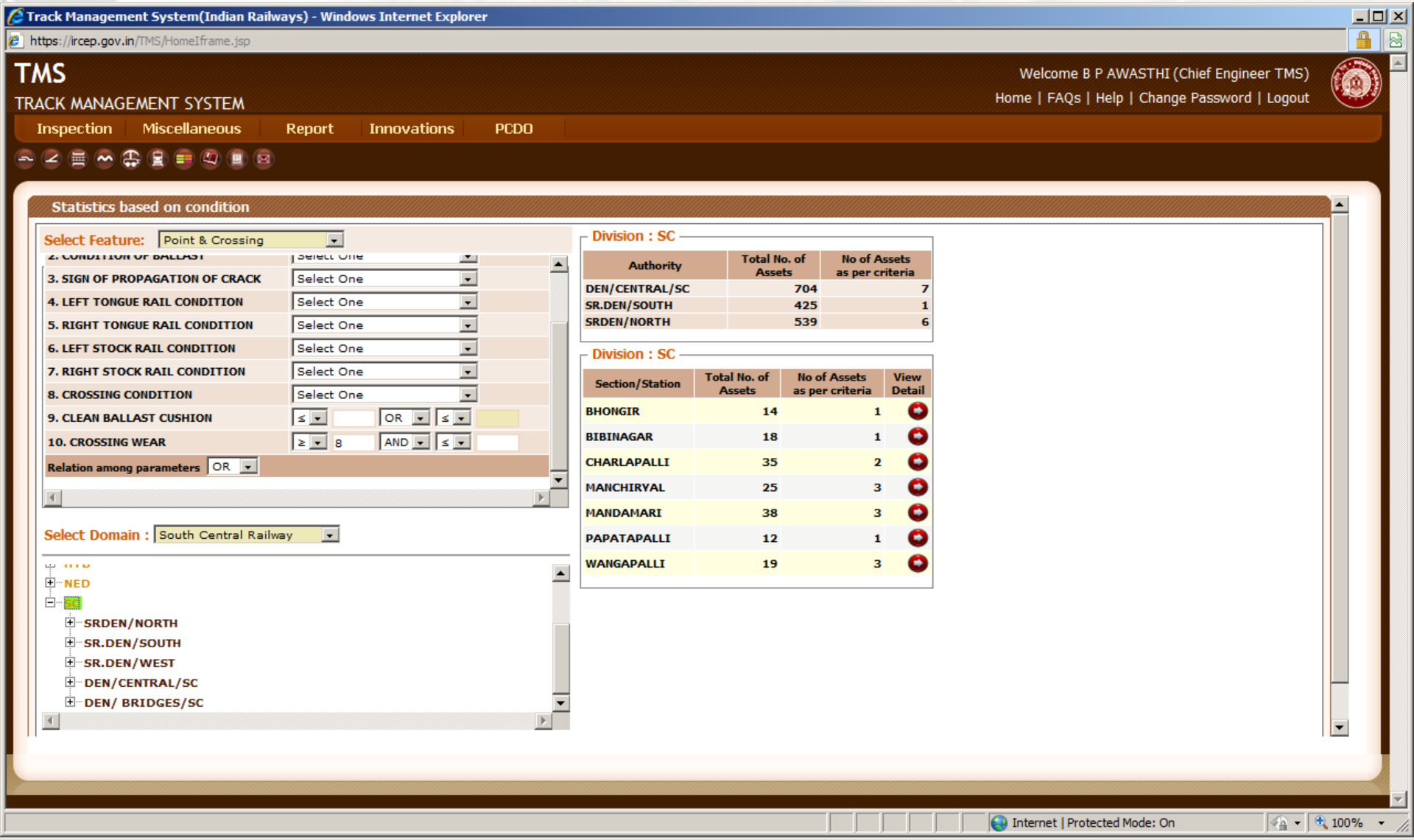
Statistics based on Condition



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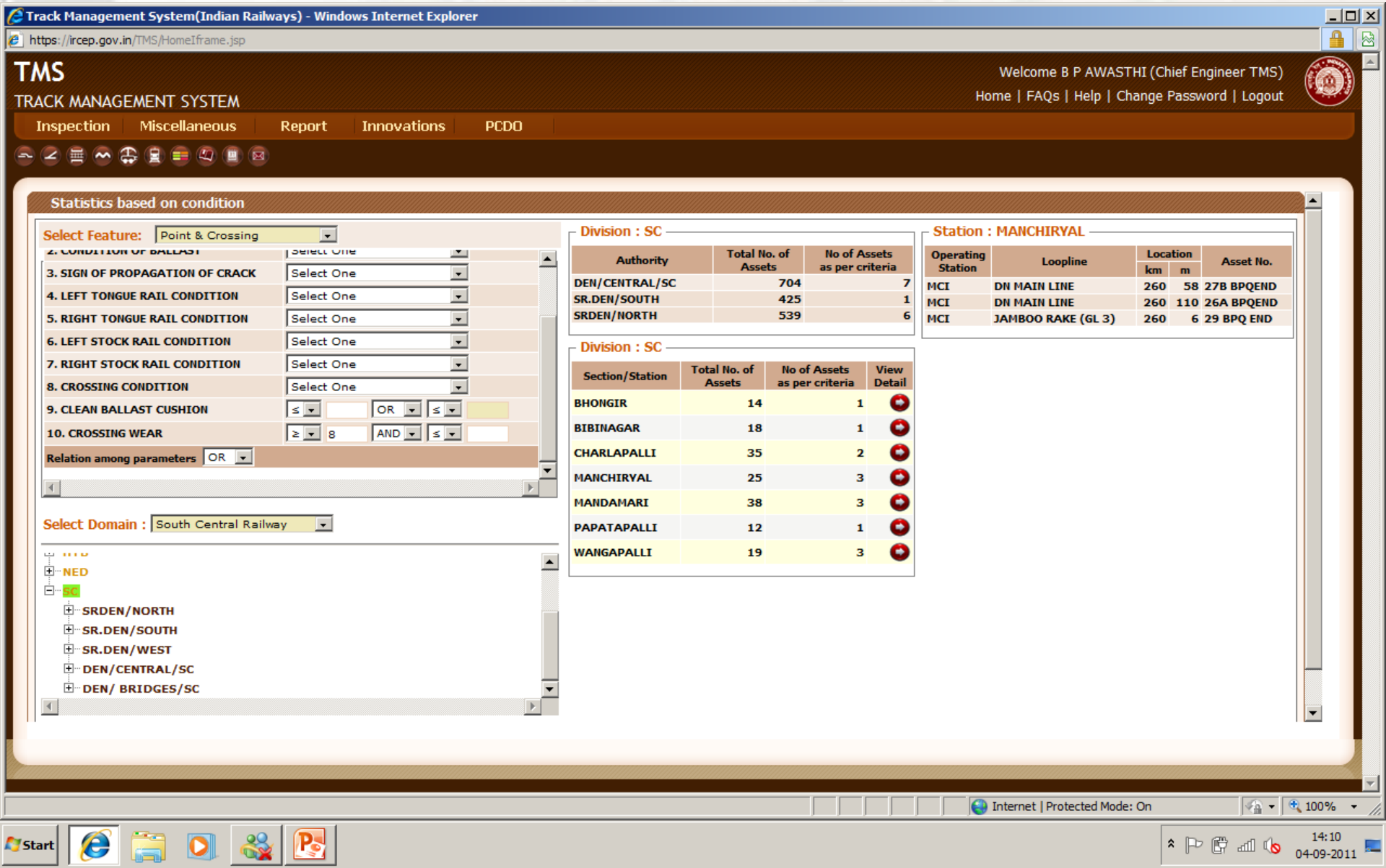
Statistics based on Condition



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Fracture Analysis

Section/Station	Rail Fracture					Weld Fracture				
	Other	90 R	52 KG	60 KG	TOTAL	Other	90 R	52 KG	60 KG	TOTAL
BN-KZJ	0	0	0	1	1	2	0	0	1	3
DKJ-MTMI	0	0	0	0	0	0	0	0	1	1
KZJ-WL	0	0	0	0	0	0	0	0	3	3
MAGH-PDPL	0	0	0	0	0	1	0	0	9	10
MLY-BN	0	0	0	0	0	1	0	0	0	1
MTMI-BZA	0	0	0	0	0	0	0	0	2	2
PDPL-KZJ	0	0	0	2	2	0	0	0	12	12
VKB-LTRR	0	0	0	0	0	0	0	3	0	3
VKB-SNF	0	0	0	0	0	0	0	5	0	5
WD-VKB	0	0	1	0	1	0	0	8	0	8
WL-DKJ	0	0	0	2	2	2	0	4	5	11
Total	0	0	1	5	6	6	0	20	33	59

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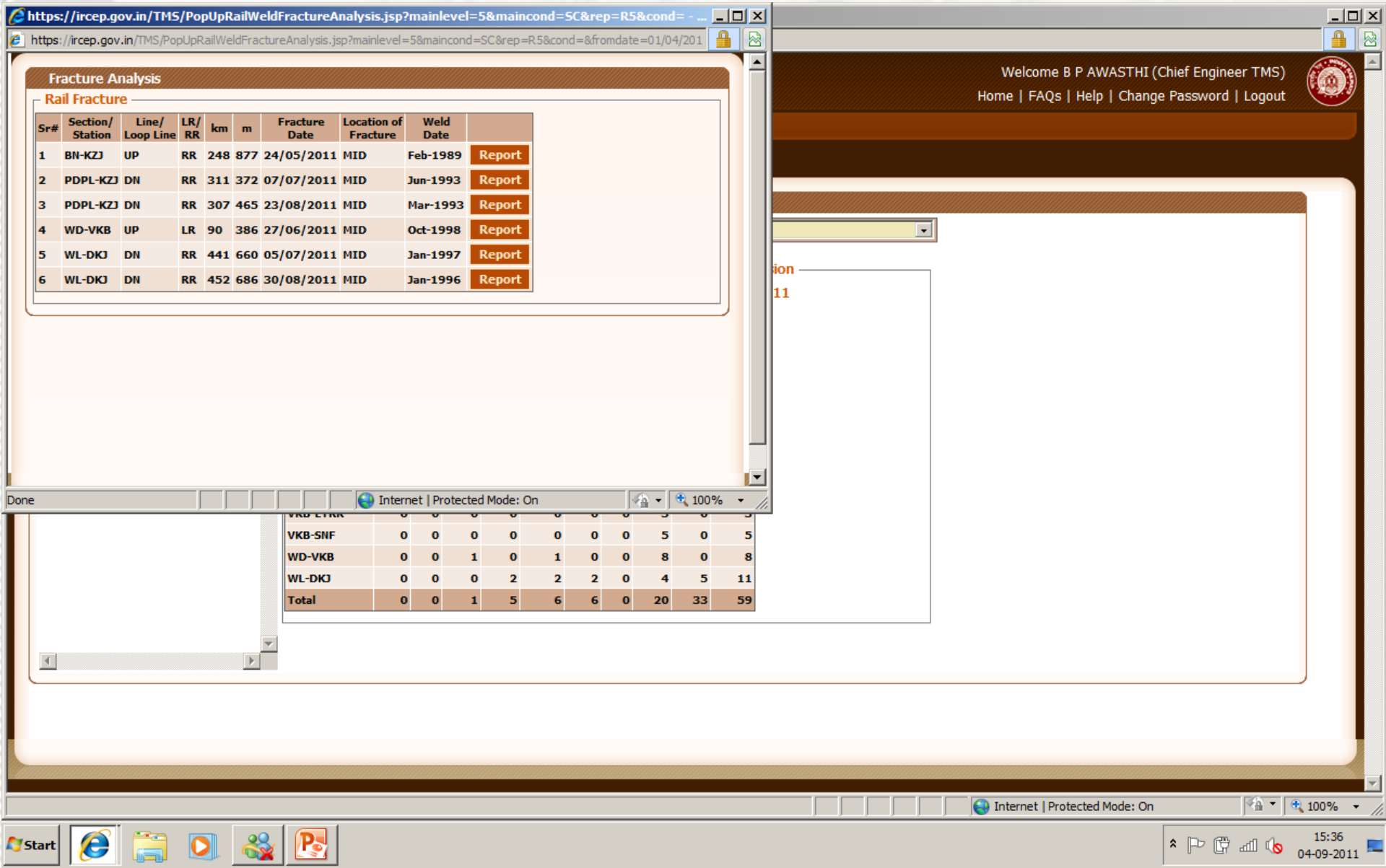
Fracture Analysis



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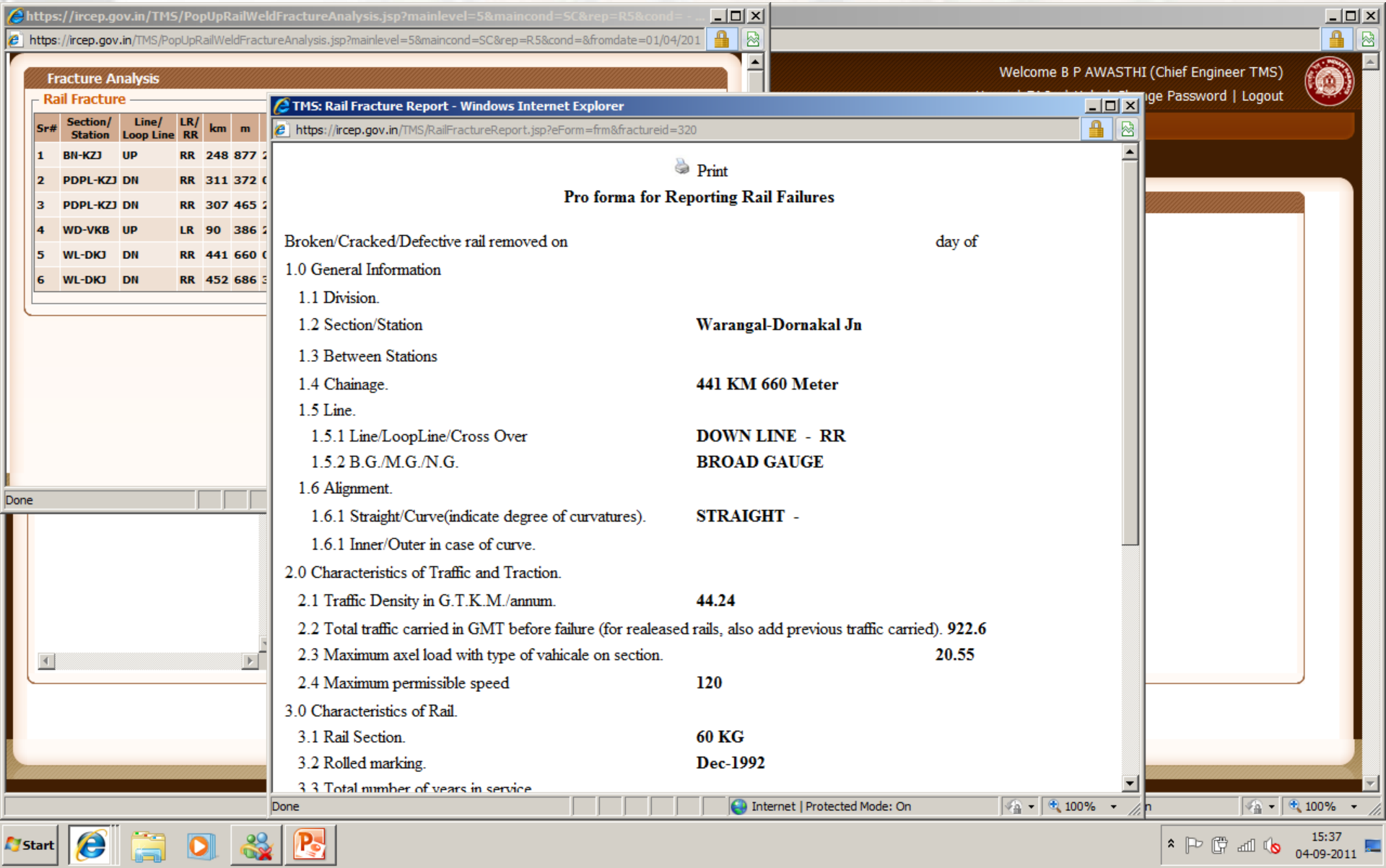
Fracture Analysis



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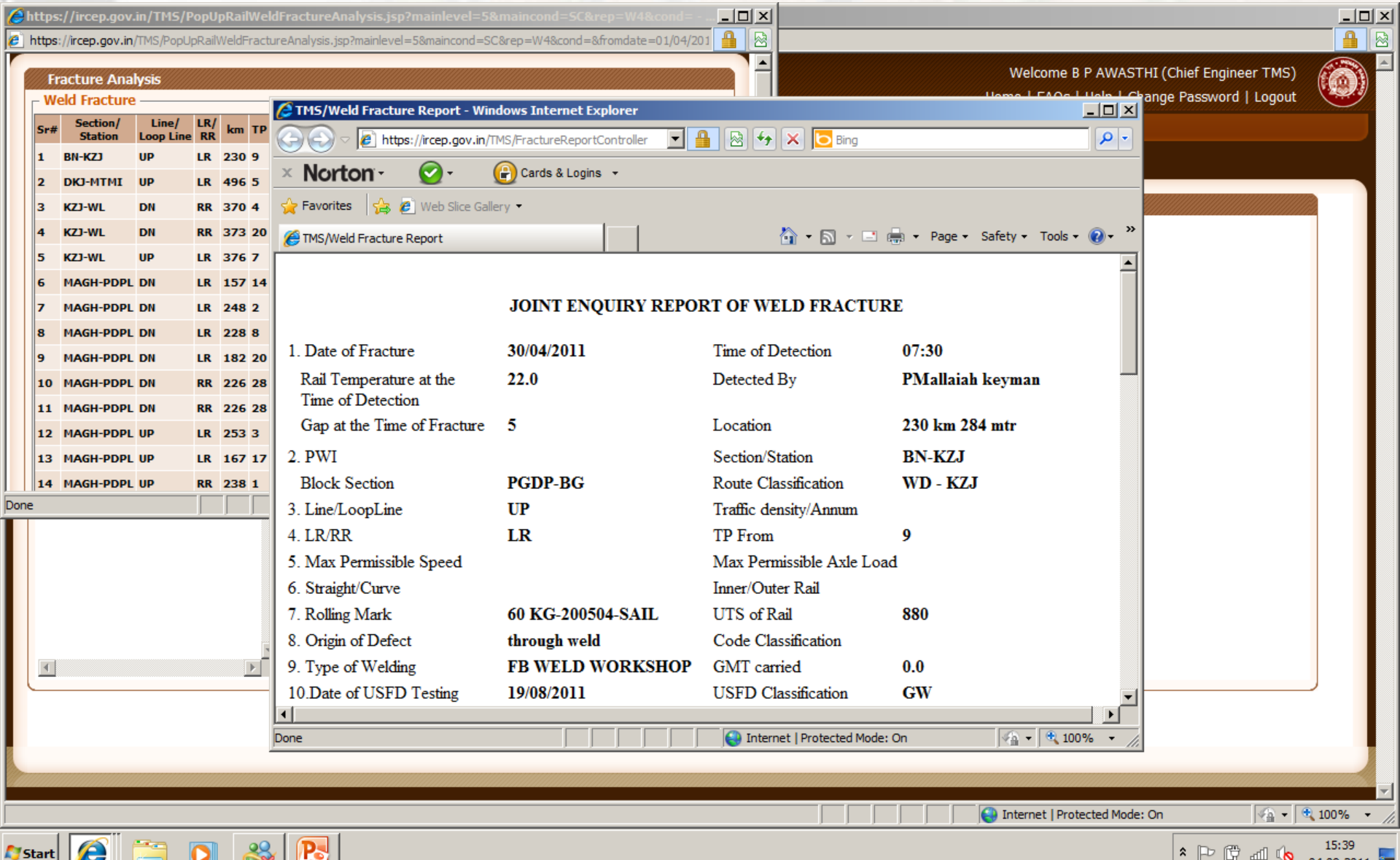
Fracture Analysis



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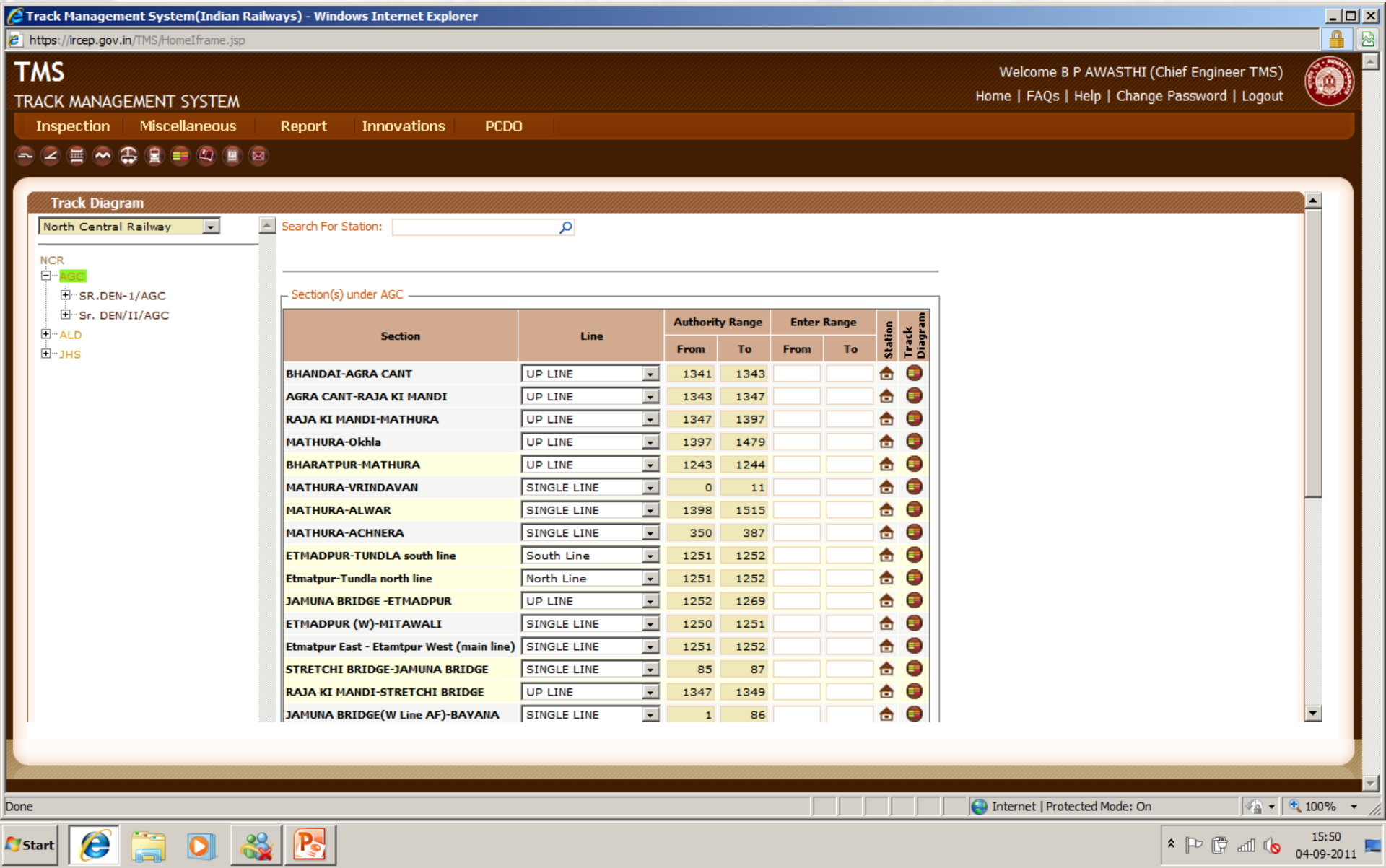
Track Diagram



Section	Line	Authority Range From	Authority Range To	Enter Range From	Enter Range To	Station	Track Diagram
BHANDAI-AGRA CANT	UP LINE	1341	1343				
AGRA CANT-RAJA KI MANDI	UP LINE	1343	1347				
RAJA KI MANDI-MATHURA	UP LINE	1347	1397				
MATHURA-Okhla	UP LINE	1397	1479				
BHARATPUR-MATHURA	UP LINE	1243	1244				
MATHURA-VRINDAVAN	SINGLE LINE	0	11				
MATHURA-ALWAR	SINGLE LINE	1398	1515				
MATHURA-ACHNERA	SINGLE LINE	350	387				
ETMADPUR-TUNDLA south line	South Line	1251	1252				
Etmatpur-Tundla north line	North Line	1251	1252				
JAMUNA BRIDGE -ETMADPUR	UP LINE	1252	1269				
ETMADPUR (W)-MITAWALI	SINGLE LINE	1250	1251				
Etmatpur East - Etamtpur West (main line)	SINGLE LINE	1251	1252				
STRETCHI BRIDGE-JAMUNA BRIDGE	SINGLE LINE	85	87				
RAJA KI MANDI-STRETCHI BRIDGE	UP LINE	1347	1349				
JAMUNA BRIDGE(W Line AF)-BAYANA	SINGLE LINE	1	86				

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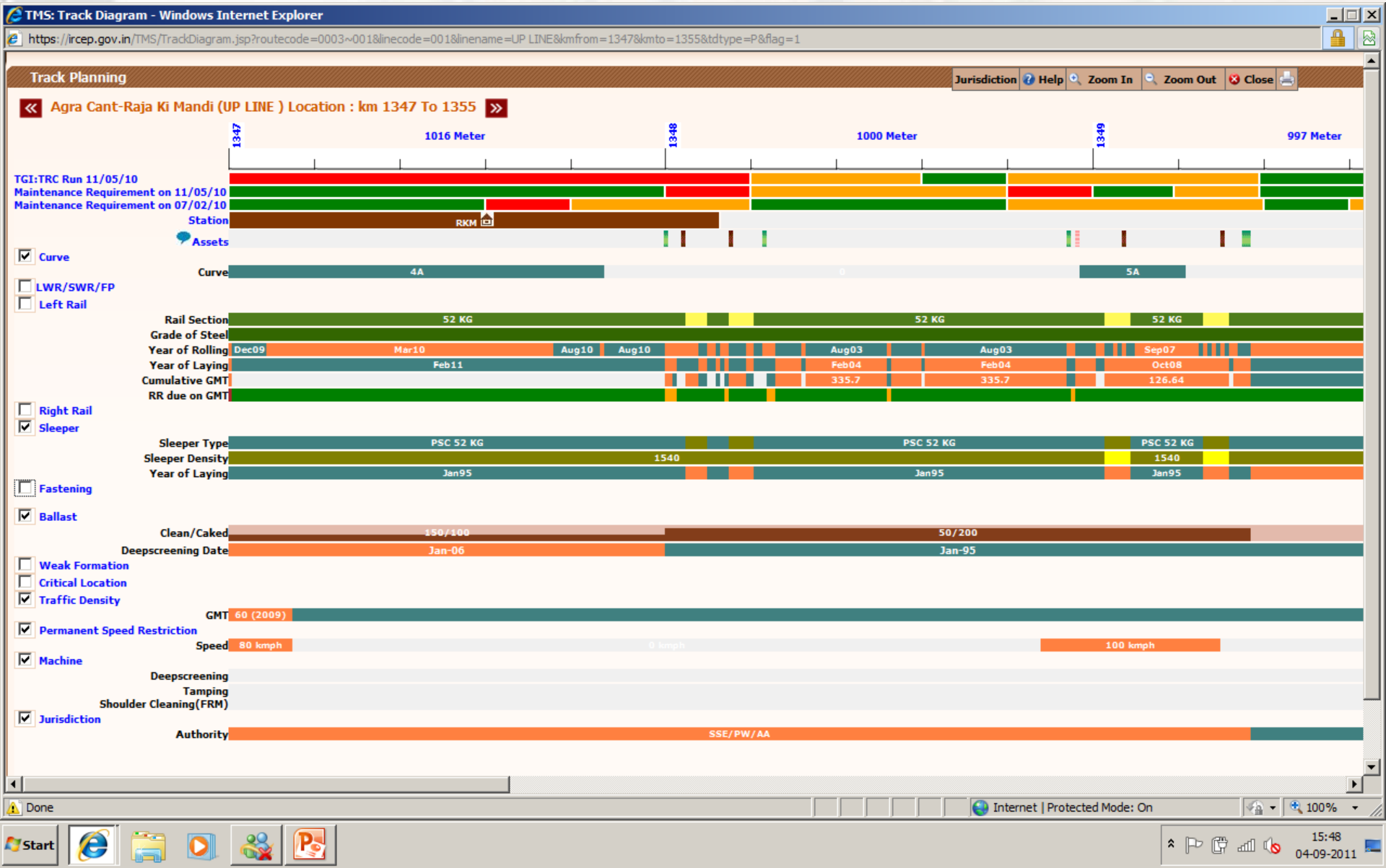
Track Diagram



Asset Details : Yard Plans

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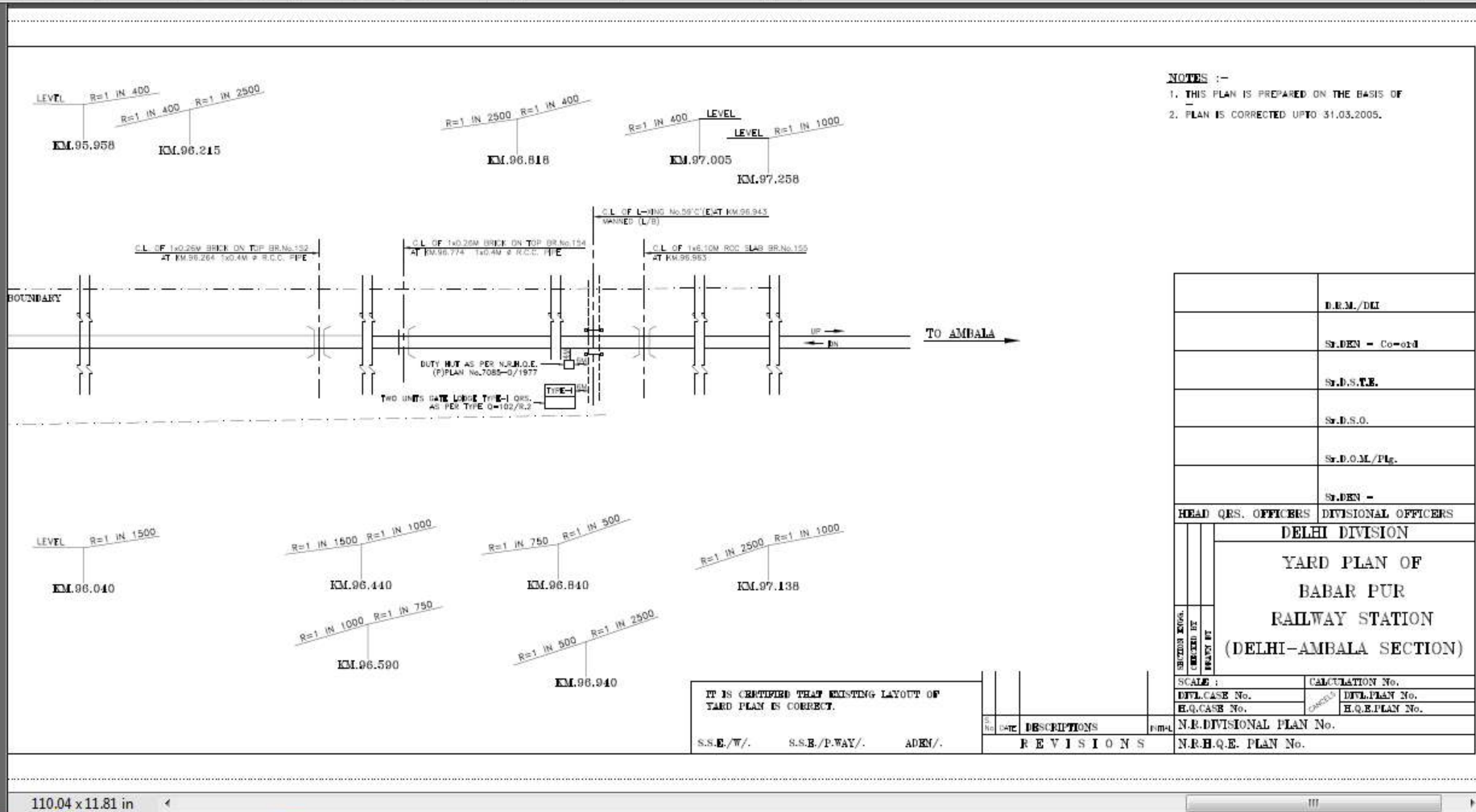
1 / 1 50% Comment Share



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05-09-2011

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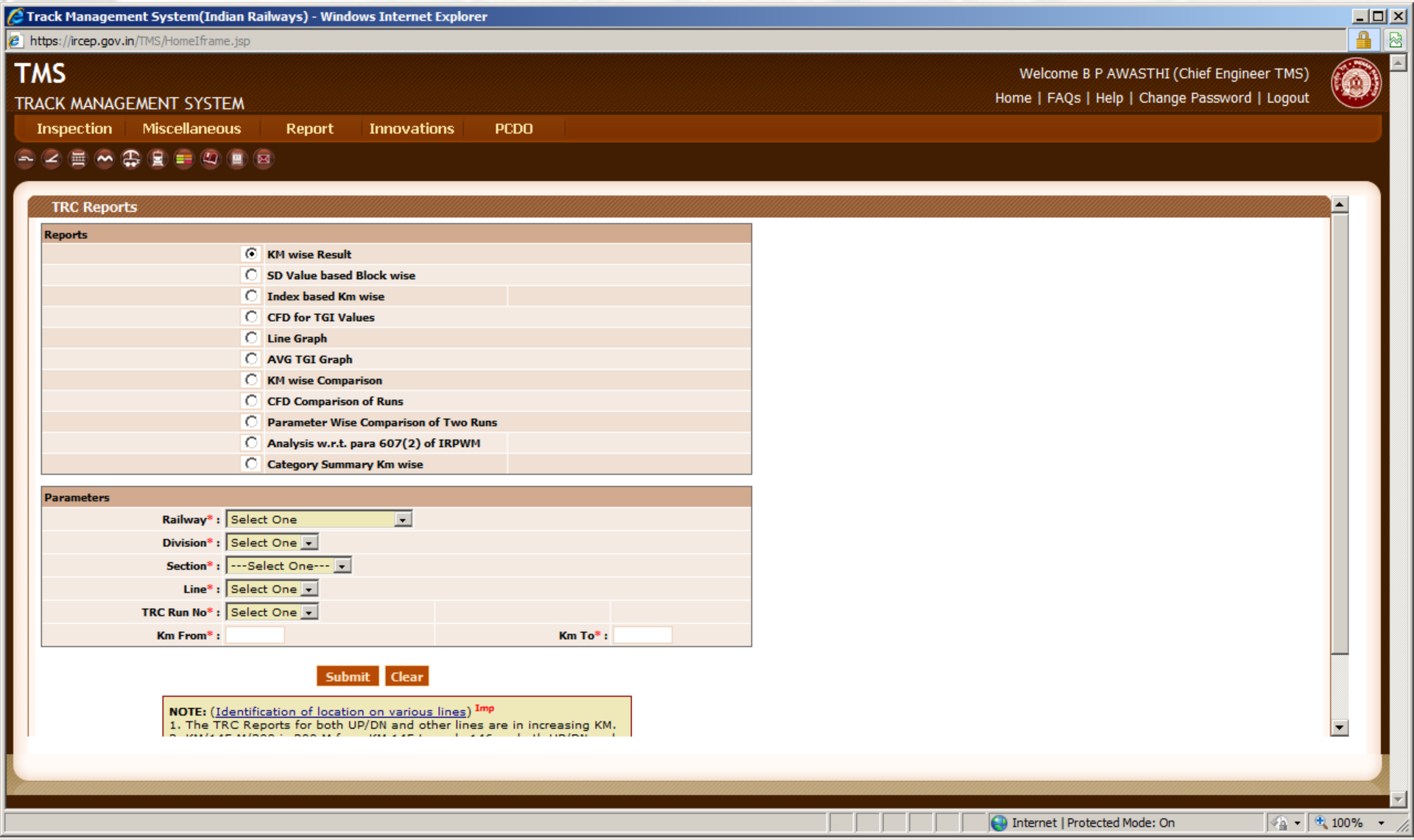
TRC Analysis & Reports



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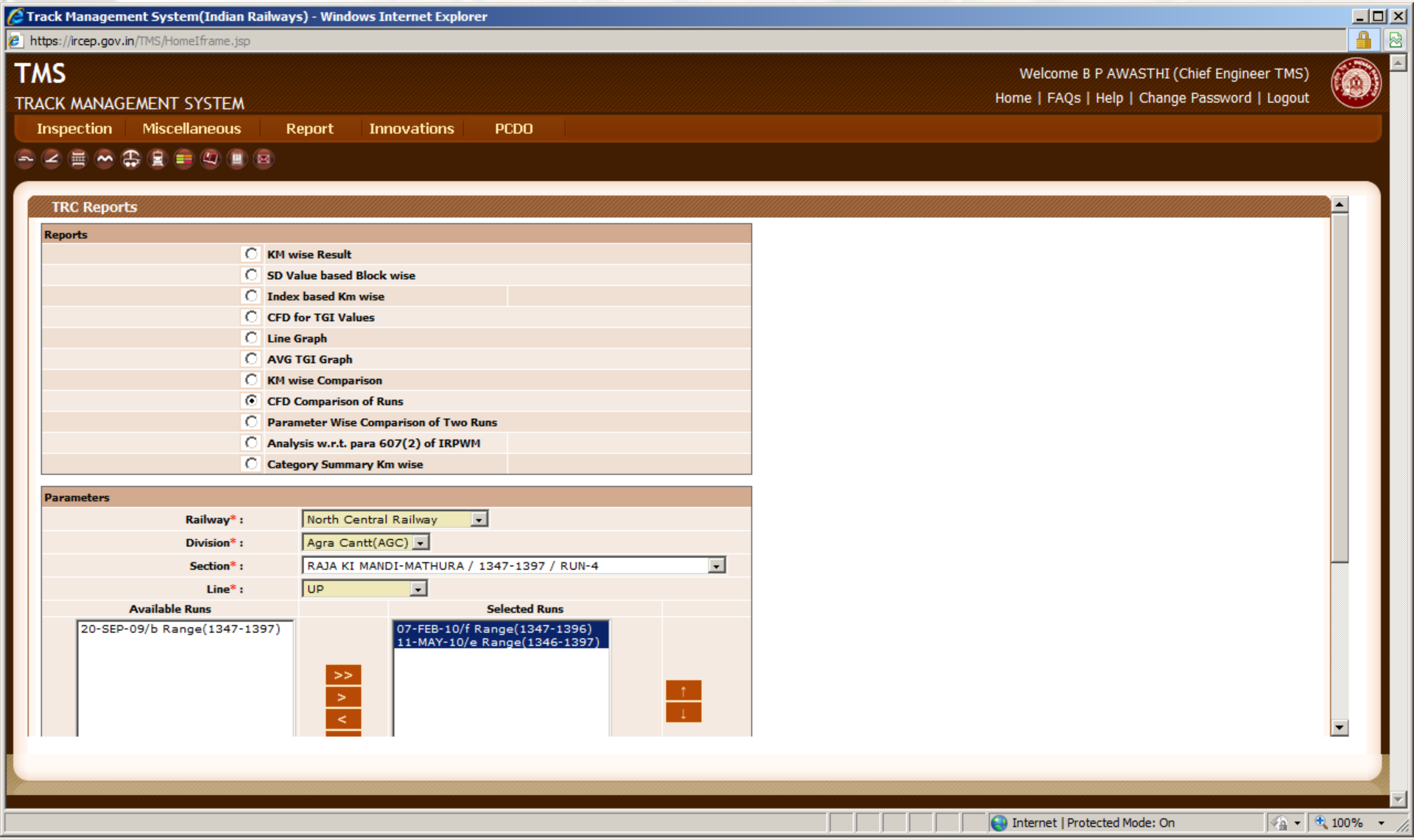

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TRC Analysis & Reports

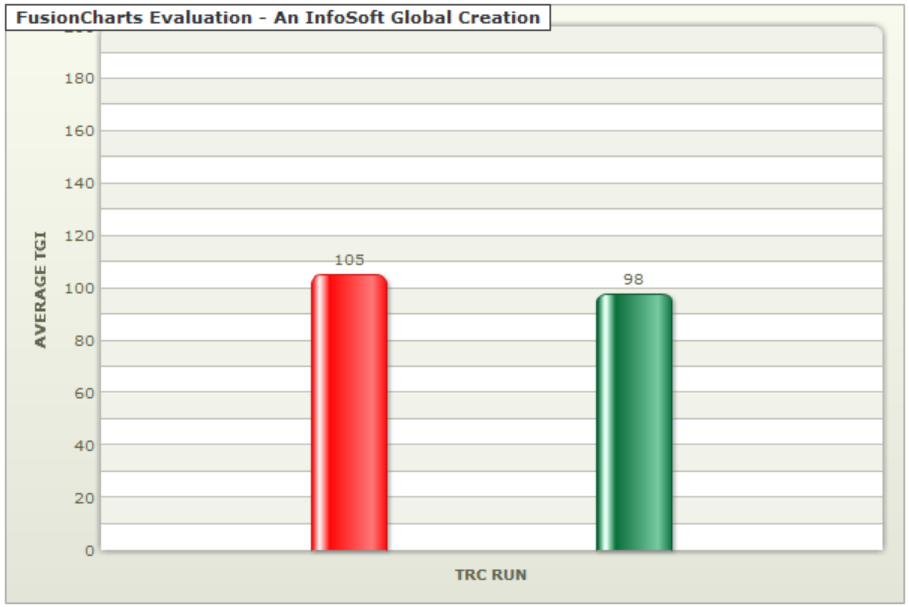
TMS: AVERAGE & CFD CHART OF TGI VALUES - Windows Internet Explorer

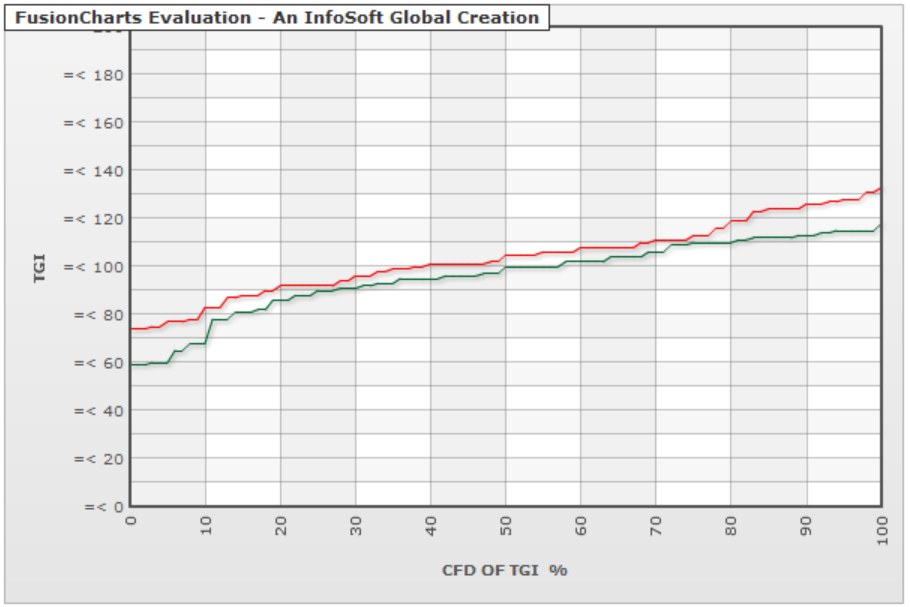
https://ircep.gov.in/TMS/AvgnCfdGraph.jsp?url=1350~1390~0003~001

AVERAGE & CFD CHART OF TGI VALUES

Print Close

UP LINE RKM-MTJ 1350 to 1390 No. of KM's = 40





RUN DATE	07/02/10	11/05/10
KMs	40	36
REC.	100%	90%

KMs	40 100%	36 90%
>100	25 63%	18 50%
>80	37 93%	32 89%
>60	40 100%	35 97%
>40	40 100%	36 100%
DATE	07/02/10	11/05/10

Done Internet | Protected Mode: On 100%

Start 15:56 04-09-2011

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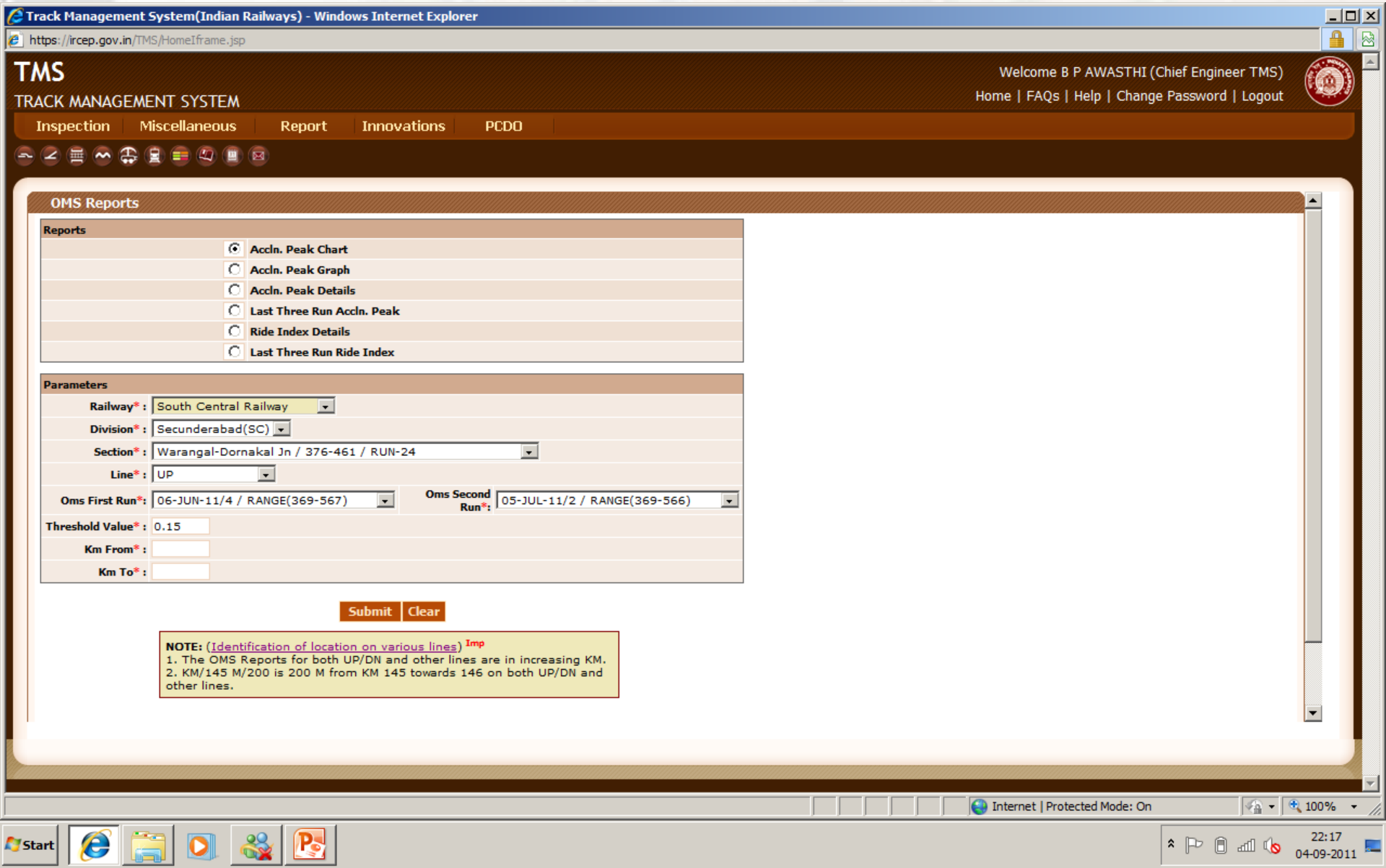
OMS Reports & Analysis



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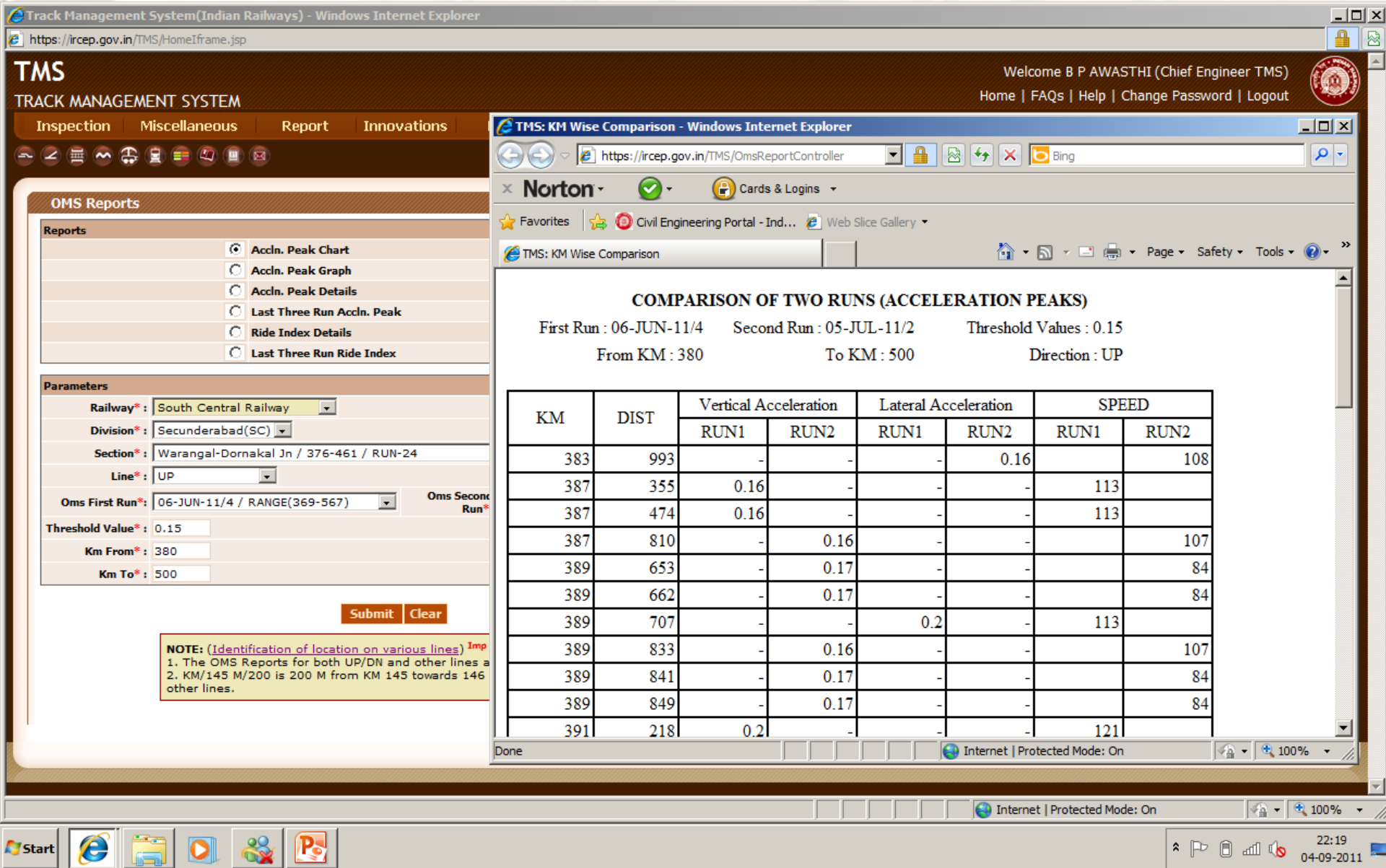
OMS Reports & Analysis



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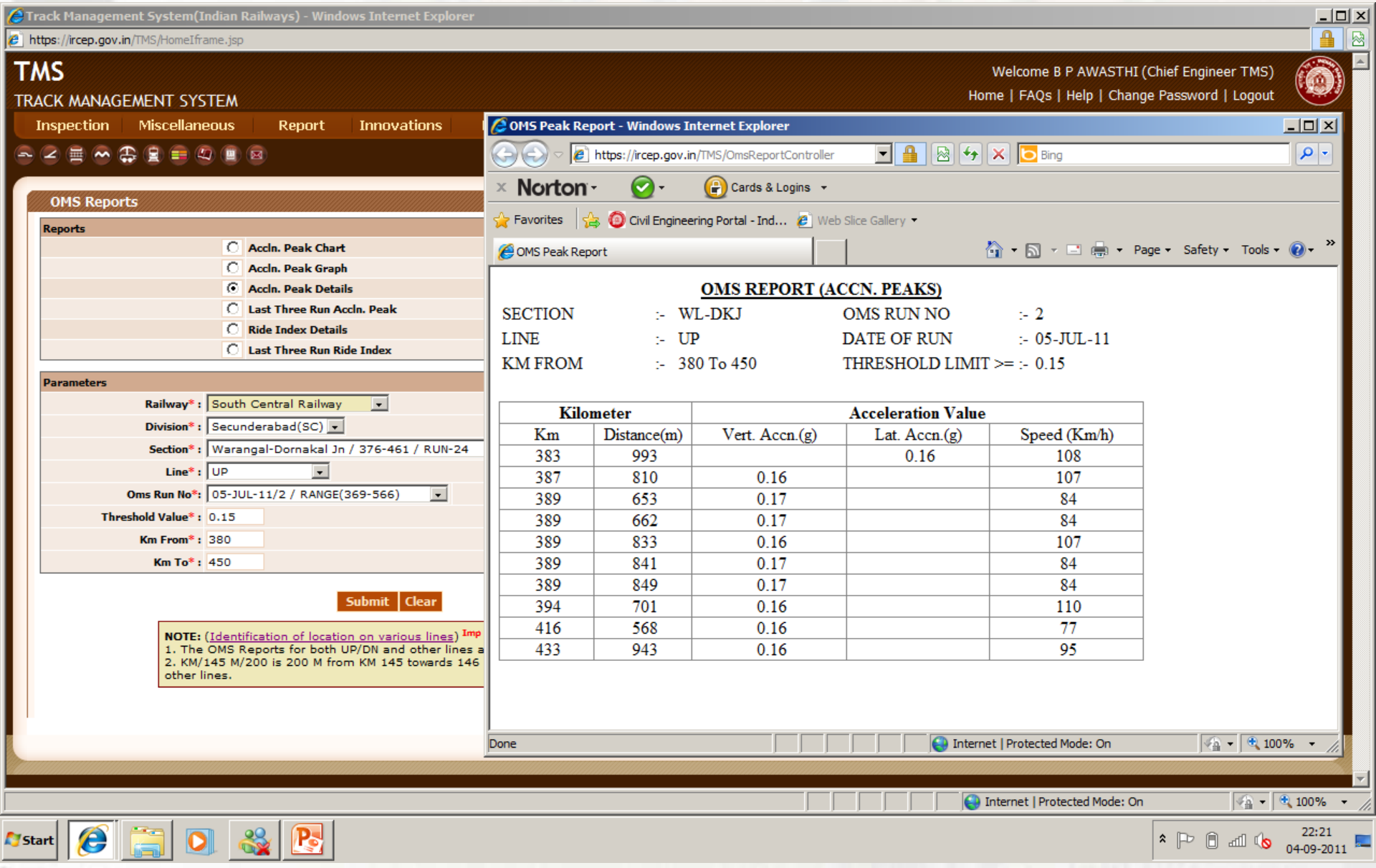
OMS Reports & Analysis



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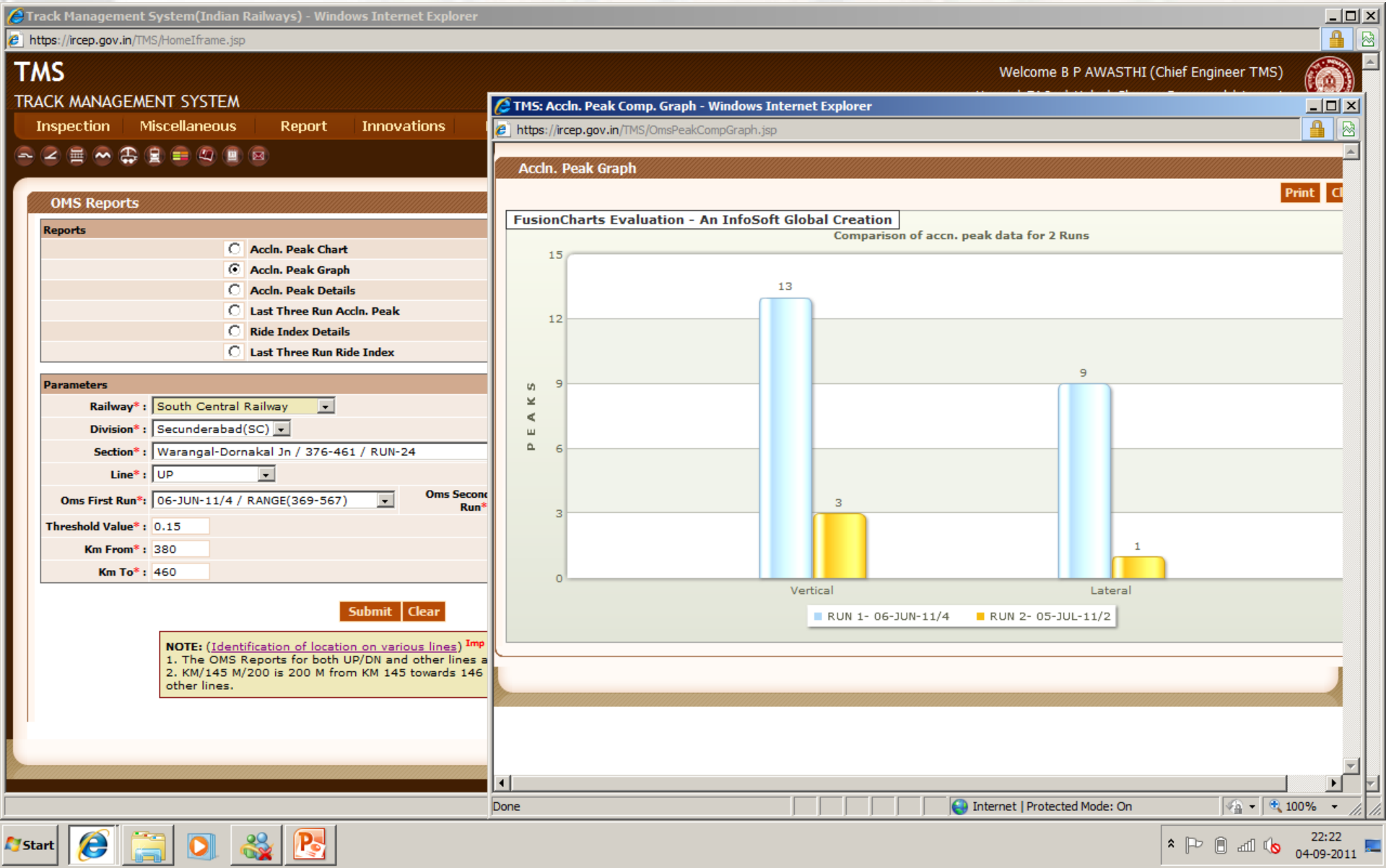
OMS Reports & Analysis



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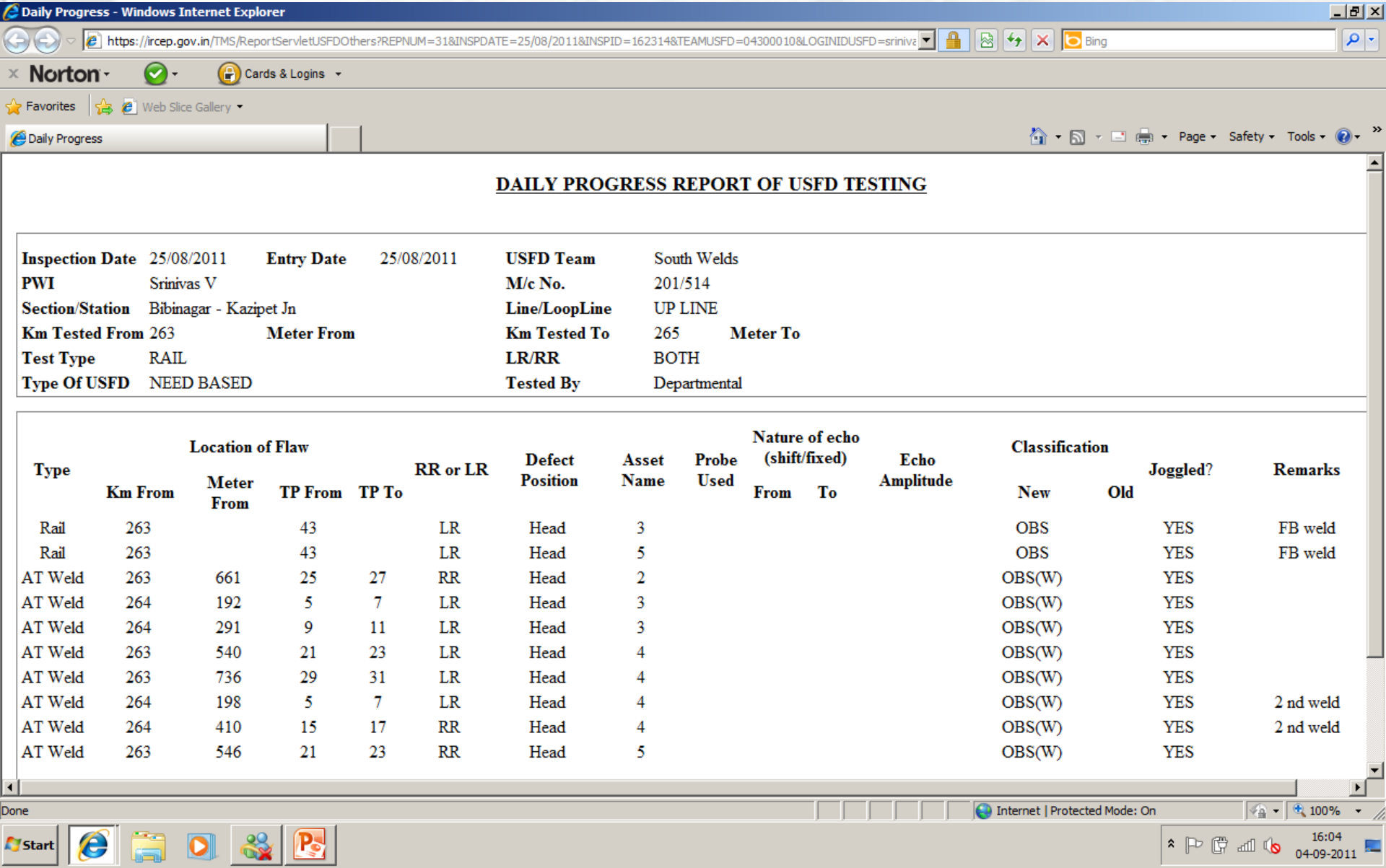
USFD Analysis & Reports



DAILY PROGRESS REPORT OF USFD TESTING

Inspection Date	25/08/2011	**Entry Date**	25/08/2011	**USFD Team**	South Welds
PWI	Srinivas V			**M/c No.**	201/514
Section/Station	Bibinagar - Kazipet Jn			**Line/LoopLine**	UP LINE
Km Tested From	263	**Meter From**		**Km Tested To**	265 **Meter To**
Test Type	RAIL			**LR/RR**	BOTH
Type Of USFD	NEED BASED			**Tested By**	Departmental

Type	Location of Flaw				RR or LR	Defect Position	Asset Name	Probe Used	Nature of echo (shift/fixed)		Echo Amplitude	Classification		Joggled?	Remarks
	Km From	Meter From	TP From	TP To					From	To		New	Old		
Rail	263		43		LR	Head	3					OBS		YES	FB weld
Rail	263		43		LR	Head	5					OBS		YES	FB weld
AT Weld	263	661	25	27	RR	Head	2					OBS(W)		YES	
AT Weld	264	192	5	7	LR	Head	3					OBS(W)		YES	
AT Weld	264	291	9	11	LR	Head	3					OBS(W)		YES	
AT Weld	263	540	21	23	LR	Head	4					OBS(W)		YES	
AT Weld	263	736	29	31	LR	Head	4					OBS(W)		YES	
AT Weld	264	198	5	7	LR	Head	4					OBS(W)		YES	2 nd weld
AT Weld	264	410	15	17	RR	Head	4					OBS(W)		YES	2 nd weld
AT Weld	263	546	21	23	RR	Head	5					OBS(W)		YES	

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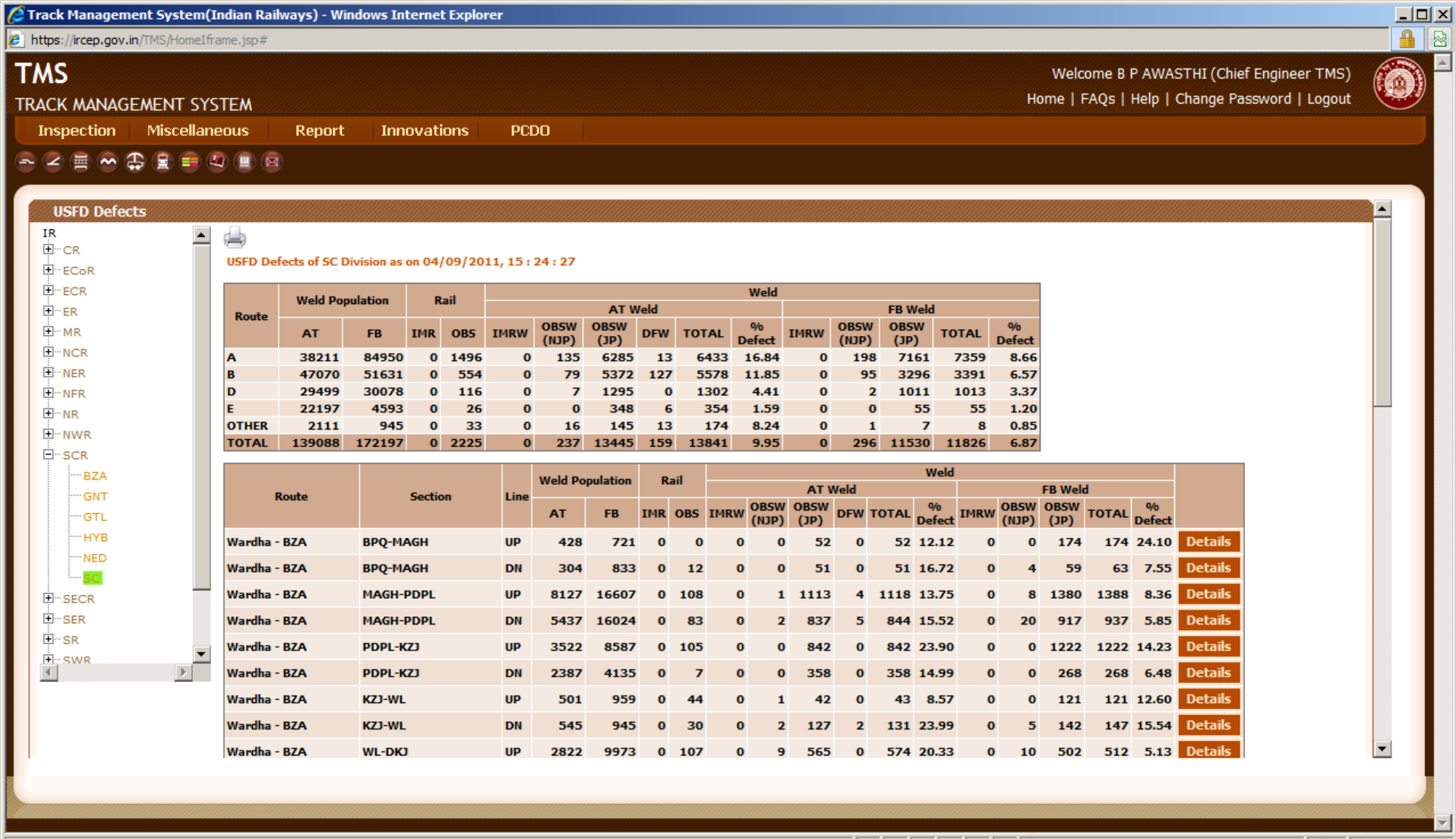
USFD Analysis & Reports

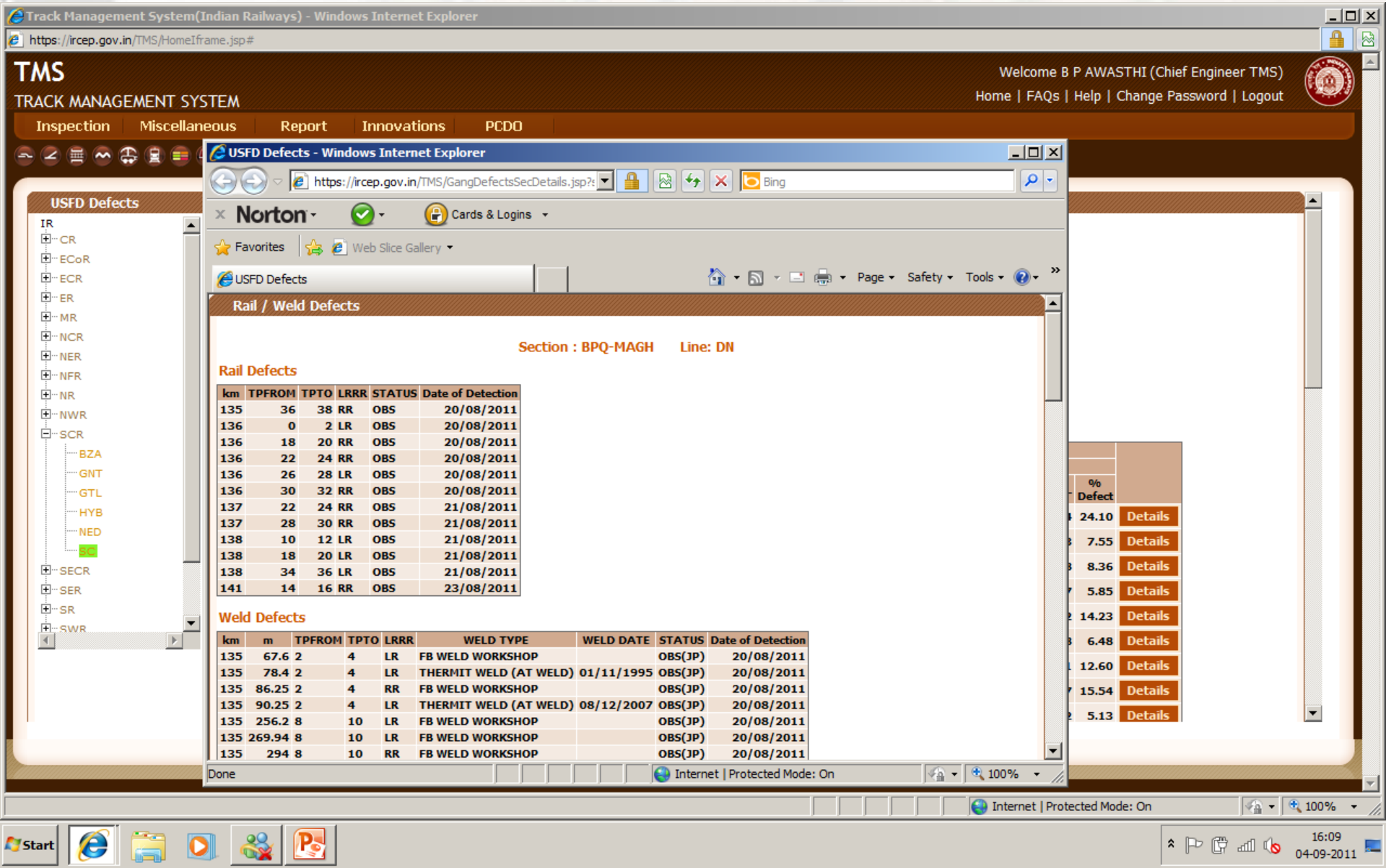


Route	Weld Population		Rail		Weld										
					AT Weld						FB Weld				
	AT	FB	IMR	OBS	IMRW	OBSW (NJP)	OBSW (JP)	DFW	TOTAL	% Defect	IMRW	OBSW (NJP)	OBSW (JP)	TOTAL	% Defect
A	38211	84950	0	1496	0	135	6285	13	6433	16.84	0	198	7161	7359	8.66
B	47070	51631	0	554	0	79	5372	127	5578	11.85	0	95	3296	3391	6.57
D	29499	30078	0	116	0	7	1295	0	1302	4.41	0	2	1011	1013	3.37
E	22197	4593	0	26	0	0	348	6	354	1.59	0	0	55	55	1.20
OTHER	2111	945	0	33	0	16	145	13	174	8.24	0	1	7	8	0.85
TOTAL	139088	172197	0	2225	0	237	13445	159	13841	9.95	0	296	11530	11826	6.87

Route	Section	Line	Weld Population		Rail		Weld										
							AT Weld						FB Weld				
			AT	FB	IMR	OBS	IMRW	OBSW (NJP)	OBSW (JP)	DFW	TOTAL	% Defect	IMRW	OBSW (NJP)	OBSW (JP)	TOTAL	% Defect
Wardha - BZA	BPQ-MAGH	UP	428	721	0	0	0	0	52	0	52	12.12	0	0	174	174	24.10
Wardha - BZA	BPQ-MAGH	DN	304	833	0	12	0	0	51	0	51	16.72	0	4	59	63	7.55
Wardha - BZA	MAGH-PDPL	UP	8127	16607	0	108	0	1	1113	4	1118	13.75	0	8	1380	1388	8.36
Wardha - BZA	MAGH-PDPL	DN	5437	16024	0	83	0	2	837	5	844	15.52	0	20	917	937	5.85
Wardha - BZA	PDPL-KZJ	UP	3522	8587	0	105	0	0	842	0	842	23.90	0	0	1222	1222	14.23
Wardha - BZA	PDPL-KZJ	DN	2387	4135	0	7	0	0	358	0	358	14.99	0	0	268	268	6.48
Wardha - BZA	KZJ-WL	UP	501	959	0	44	0	1	42	0	43	8.57	0	0	121	121	12.60
Wardha - BZA	KZJ-WL	DN	545	945	0	30	0	2	127	2	131	23.99	0	5	142	147	15.54
Wardha - BZA	WL-DKJ	UP	2822	9973	0	107	0	9	565	0	574	20.33	0	10	502	512	5.13

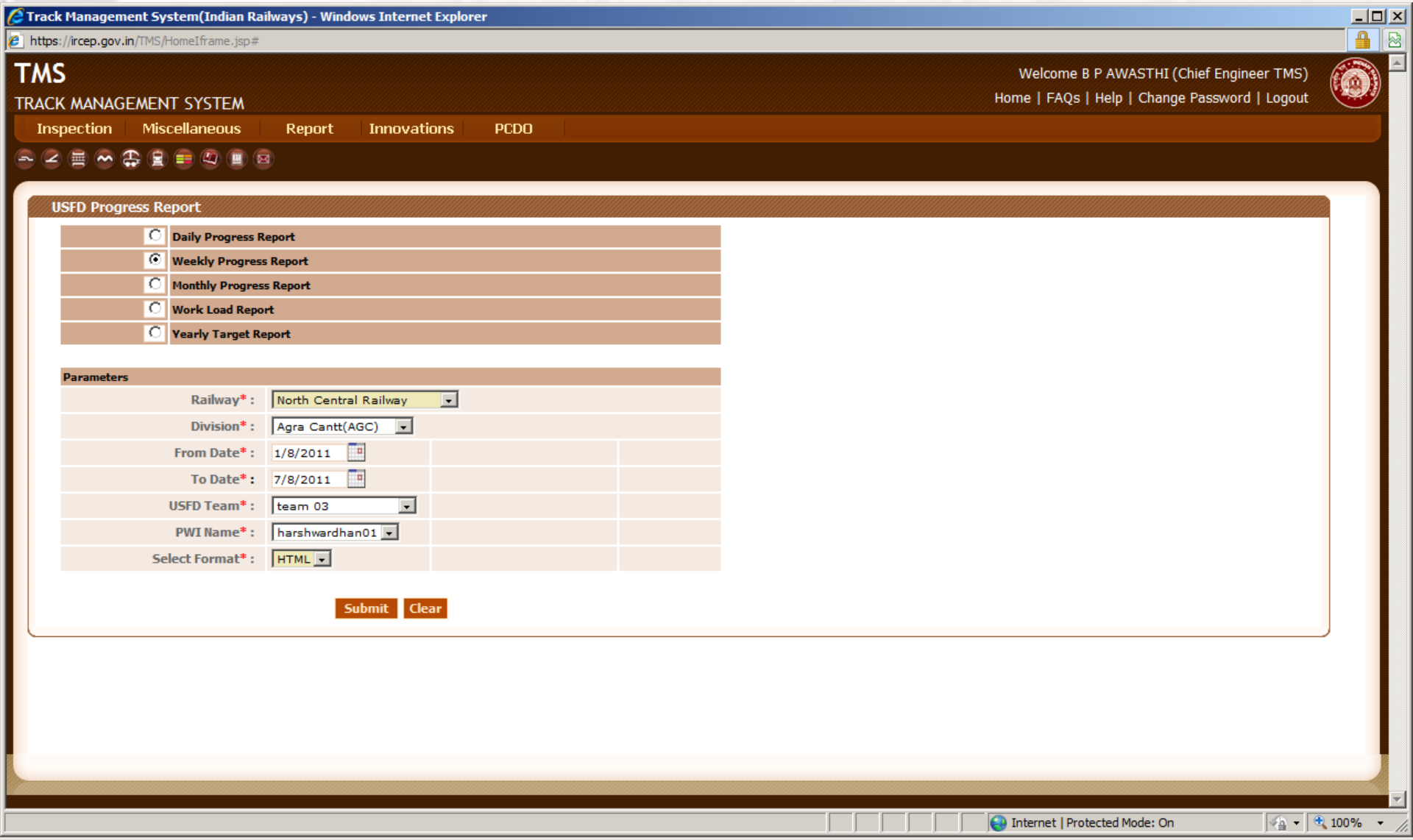
TMS
TRACK MANAGEMENT SYSTEM

USFD Analysis & Reports



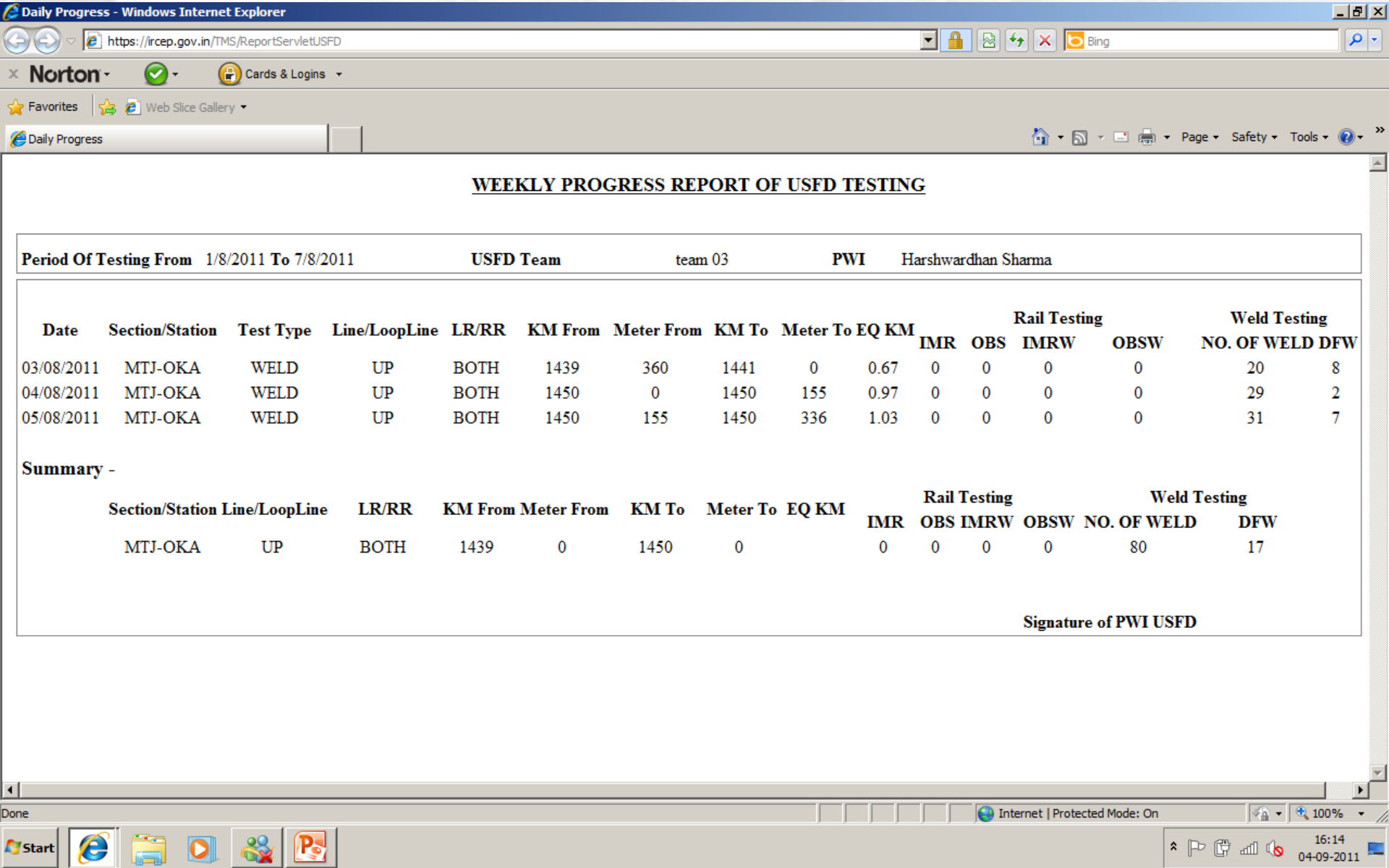
TMS
TRACK MANAGEMENT SYSTEM

USFD Analysis & Reports



TMS
TRACK MANAGEMENT SYSTEM

USFD Analysis & Reports



WEEKLY PROGRESS REPORT OF USFD TESTING

Period Of Testing From 1/8/2011 **To** 7/8/2011 **USFD Team** team 03 **PWI** Harshwardhan Sharma

Date	Section/Station	Test Type	Line/LoopLine	LR/RR	KM From	Meter From	KM To	Meter To	EQ KM	Rail Testing				Weld Testing	
										IMR	OBS	IMRW	OBSW	NO. OF WELD	DFW
03/08/2011	MTJ-OKA	WELD	UP	BOTH	1439	360	1441	0	0.67	0	0	0	0	20	8
04/08/2011	MTJ-OKA	WELD	UP	BOTH	1450	0	1450	155	0.97	0	0	0	0	29	2
05/08/2011	MTJ-OKA	WELD	UP	BOTH	1450	155	1450	336	1.03	0	0	0	0	31	7

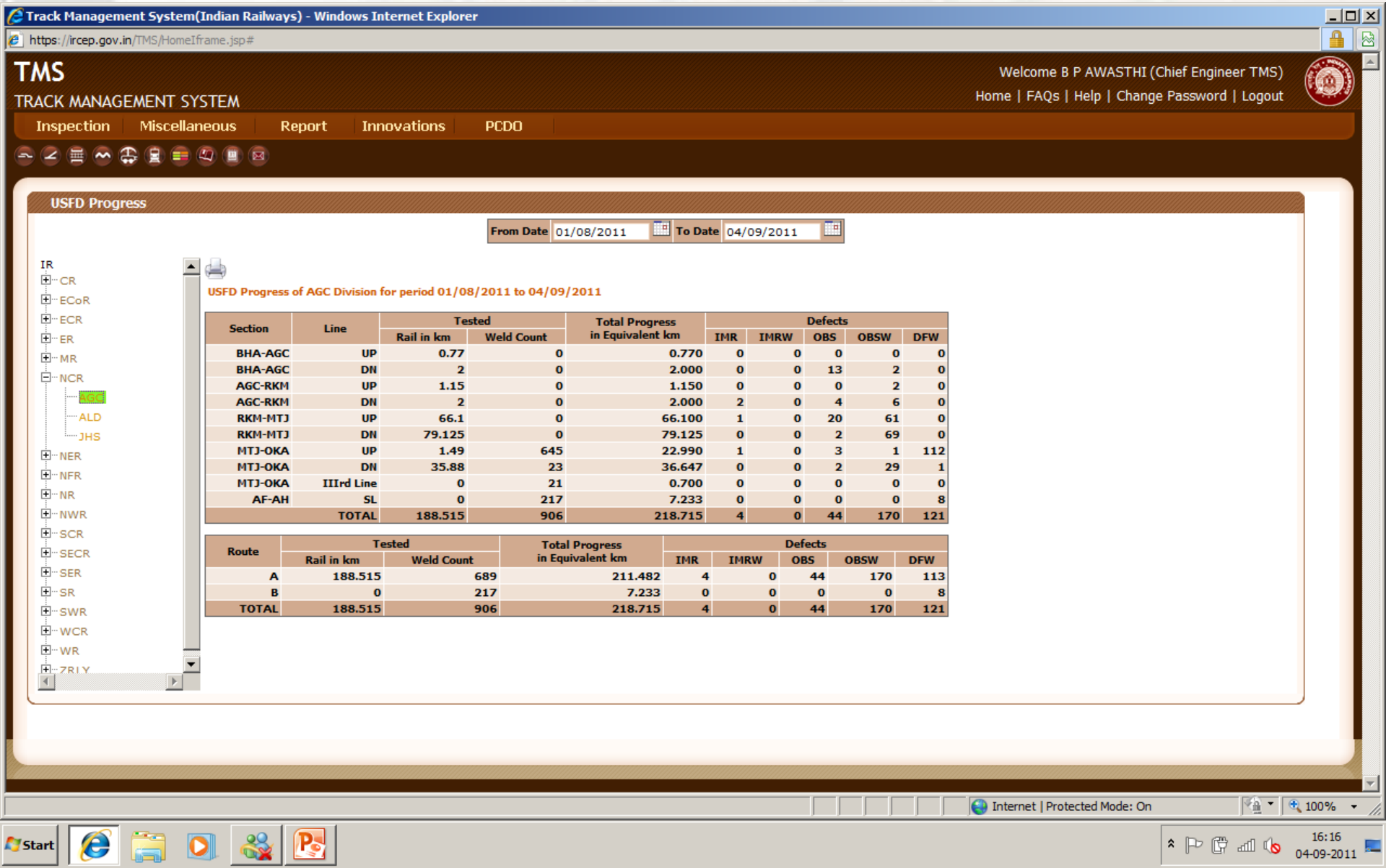
Summary -

Section/Station	Line/LoopLine	LR/RR	KM From	Meter From	KM To	Meter To	EQ KM	Rail Testing				Weld Testing	
								IMR	OBS	IMRW	OBSW	NO. OF WELD	DFW
MTJ-OKA	UP	BOTH	1439	0	1450	0		0	0	0	0	80	17

Signature of PWI USFD

TMS
TRACK MANAGEMENT SYSTEM

USFD Analysis & Reports

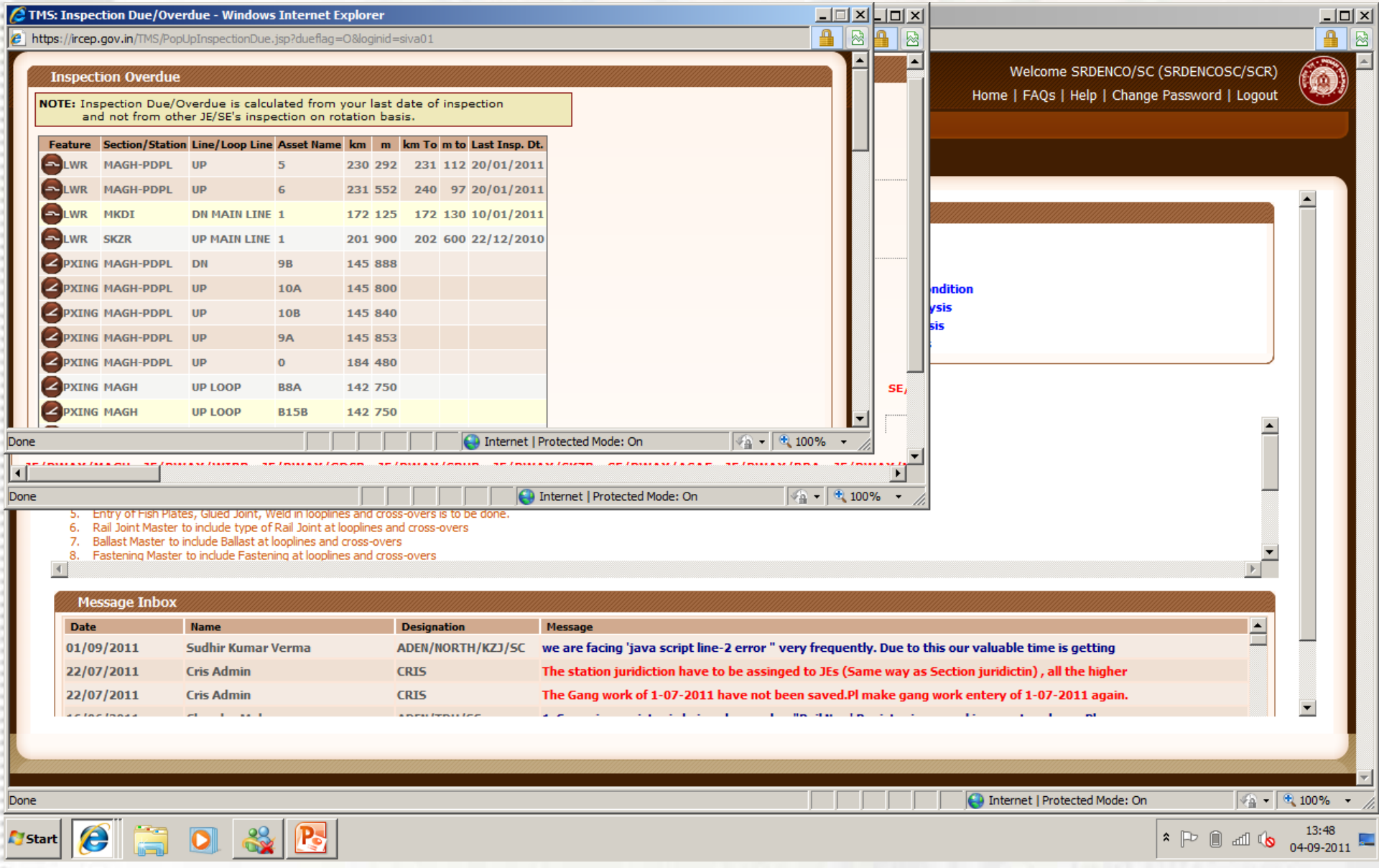


Section	Line	Tested		Total Progress in Equivalent km	Defects				
		Rail in km	Weld Count		IMR	IMRW	OBS	OBSW	DFW
BHA-AGC	UP	0.77	0	0.770	0	0	0	0	0
BHA-AGC	DN	2	0	2.000	0	0	13	2	0
AGC-RKM	UP	1.15	0	1.150	0	0	0	2	0
AGC-RKM	DN	2	0	2.000	2	0	4	6	0
RKM-MTJ	UP	66.1	0	66.100	1	0	20	61	0
RKM-MTJ	DN	79.125	0	79.125	0	0	2	69	0
MTJ-OKA	UP	1.49	645	22.990	1	0	3	1	112
MTJ-OKA	DN	35.88	23	36.647	0	0	2	29	1
MTJ-OKA	IIIrd Line	0	21	0.700	0	0	0	0	0
AF-AH	SL	0	217	7.233	0	0	0	0	8
	TOTAL	188.515	906	218.715	4	0	44	170	121

Route	Tested		Total Progress in Equivalent km	Defects				
	Rail in km	Weld Count		IMR	IMRW	OBS	OBSW	DFW
A	188.515	689	211.482	4	0	44	170	113
B	0	217	7.233	0	0	0	0	8
TOTAL	188.515	906	218.715	4	0	44	170	121

TMS
TRACK MANAGEMENT SYSTEM

Alerts : Inspection Overdue



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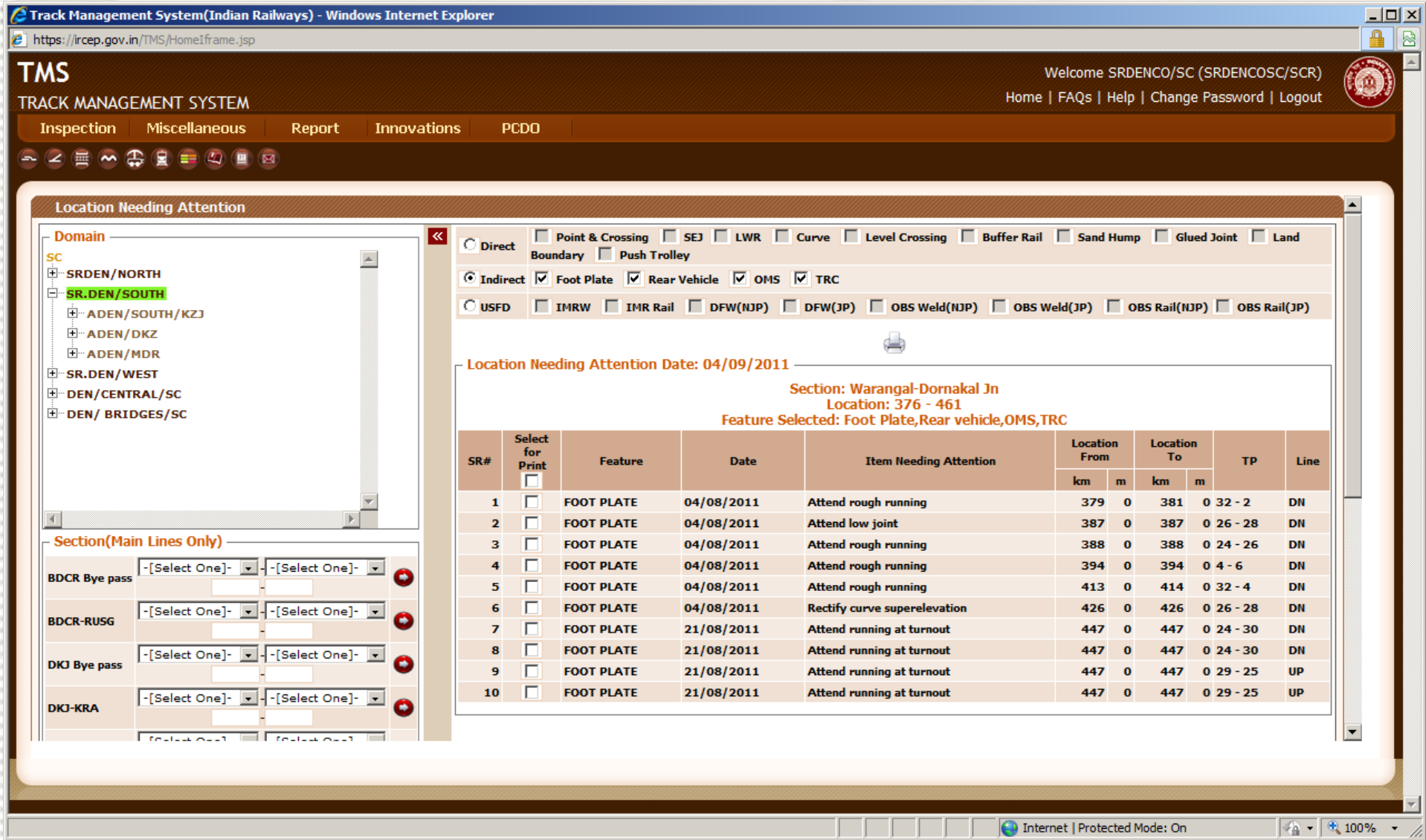
Locations Needing Attention



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Gang Usage

Track Management System(Indian Railways) - Windows Internet Explorer

https://ircep.gov.in/TMS/HomeIframe.jsp

TMS
TRACK MANAGEMENT SYSTEM

Welcome B P AWASTHI (Chief Engineer TMS)
Home | FAQs | Help | Change Password | Logout

Inspection | Miscellaneous | Report | Innovations | PCDO

Gang Usage

South Central Railway

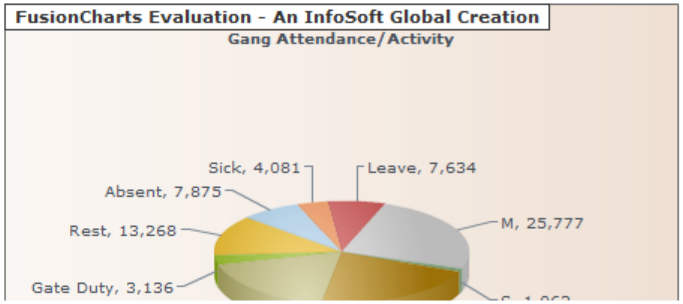
From Date 01/04/2011 To Date 04/09/2011

- SCR
  - BZA
  - GNT
  - GTL
  - HYB
  - NED
  - SC
    - SRDEN/NORTH
    - SR.DEN/SOUTH
    - SR.DEN/WEST
    - DEN/CENTRAL/SC
    - DEN/ BRIDGES/SC

Track Men in numbers								Activity				Unaccounted
Sr ADEN/ADEN	Sanctioned	On Roll	Leave	Sick	Absent	Rest	Gate Duty	T	R	S	M	
ADEN/DKZ	59973	38382	2509	1554	3808	5315	1477	6569	9904	401	6342	503
ADEN/MDR	45882	32271	2150	804	1847	3267	1033	5741	4197	369	11926	937
ADEN/SOUTH/KZJ	50027	37923	2975	1723	2220	4686	626	6775	7745	292	7509	3372
Total	155882	108576	7634	4081	7875	13268	3136	19085	21846	1062	25777	4812

			Track Men in percentage					Activity				Unaccounted (%)
Sr ADEN/ADEN	Sanctioned	On Roll	Leave(%)	Sick(%)	Absent(%)	Rest(%)	Gate Duty(%)	T(%)	R(%)	S(%)	M(%)	
ADEN/DKZ	59973	38382	6.54	4.05	9.92	13.85	3.85	17.11	25.80	1.04	16.52	1.31
ADEN/MDR	45882	32271	6.66	2.49	5.72	10.12	3.20	17.79	13.01	1.14	36.96	2.90
ADEN/SOUTH/KZJ	50027	37923	7.84	4.54	5.85	12.36	1.65	17.87	20.42	0.77	19.80	8.89
Total	155882	108576	7.03	3.76	7.25	12.22	2.89	17.58	20.12	0.98	23.74	4.43

FusionCharts Evaluation - An InfoSoft Global Creation



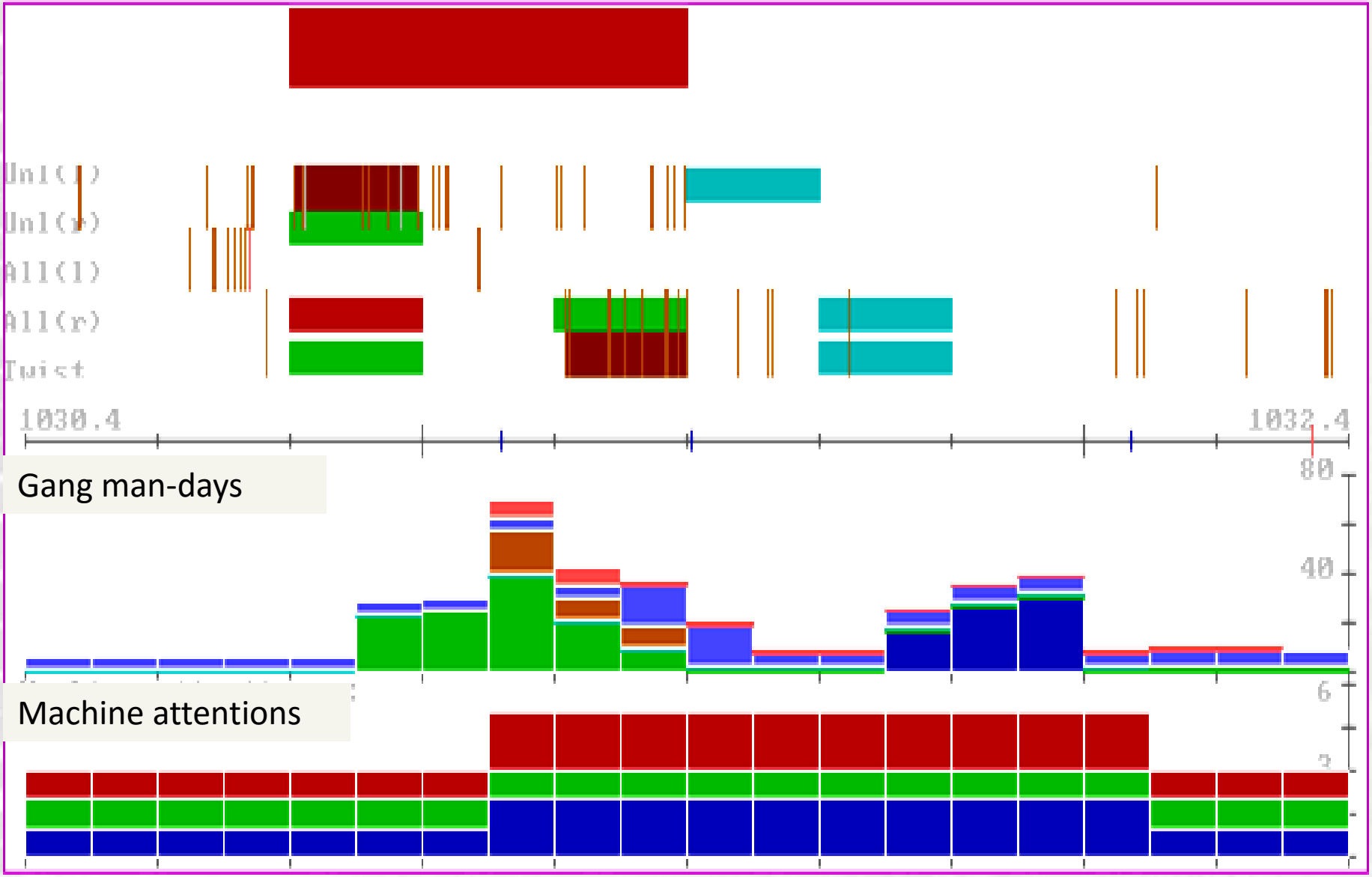
T : Activities Affected By Traffic Density.
R : Routine Activities Unaffected By Traffic Density.
S : Site-Specific Activities.
M : Auxiliary Maintenance Activities.

Internet | Protected Mode: On 100%

Start 22:27 04-09-2011

TMS
TRACK MANAGEMENT SYSTEM

Track Maintenance Planning



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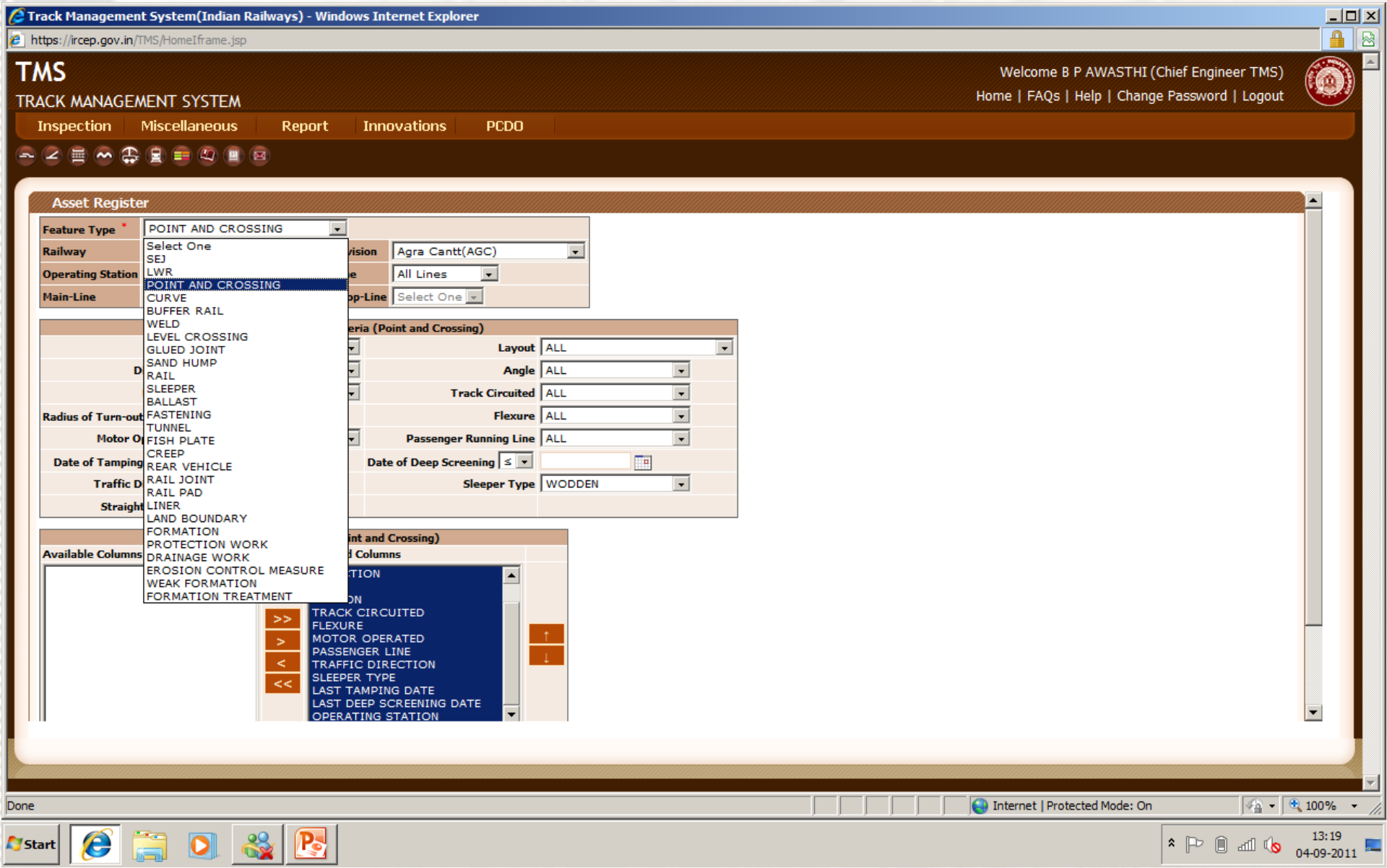
Track Asset Register/Details



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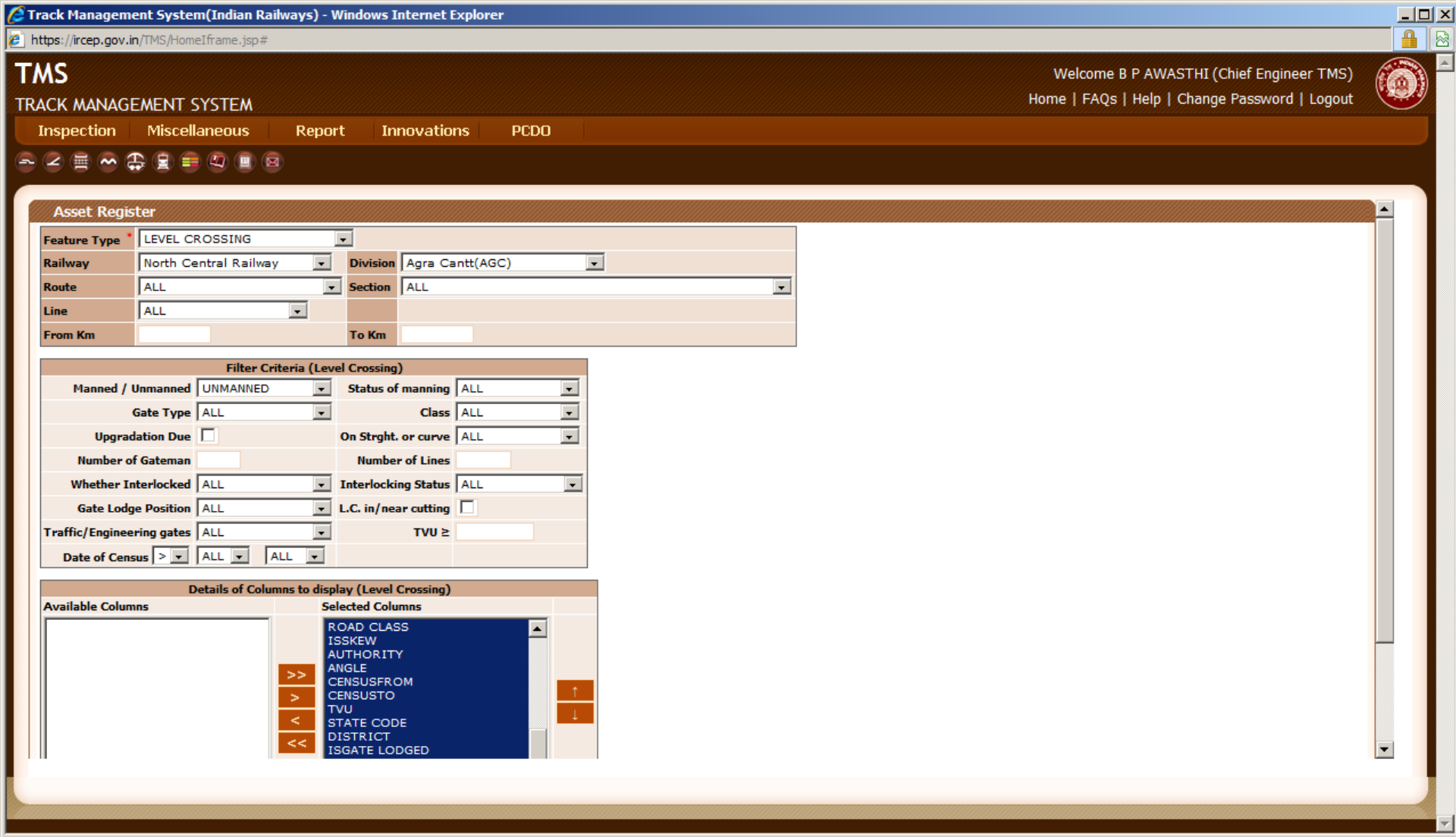
Track Asset Register/Details



TMS
TRACK MANAGEMENT SYSTEM

Knowledge Management

Benefits

- ✓ Intelligent Actionable Reports available Anytime Anywhere
- ✓ No Time lag between data gathering and analysis there off
- ✓ Better decision making on account of data analysis at different levels of hierarchy
- ✓ Prioritization of Works based on inspection results
- ✓ Defect do not get lost till attended
- ✓ Quality of inspection vastly improved
- ✓ Proactive maintenance.
- ✓ Inventory management – warning of stores falling below critical limit

INDIAN RAILWAYS

TMS
TRACK MANAGEMENT SYSTEM

Benefits Beyond Business

Environmental impact

- Contribution to the Planet Earth by removing 35-40 files that each
- PWI holds to input the track maintenance data
- Indian Railways has 5000-6000 PWIs across all over India.
- TMS will help to save close to 200 trees a year.

Cultural Impact

- This is the first time that technology is reaching the person right at the bottom of the Railway Task Force hierarchy, i.e., the Section PWI, who is responsible for the upkeep of the track.
- TMS is being seen as a socially inclusive program helping to bridge the technology gap in the Railway Management hierarchy

Social Impact

- The ability to proactively maintain track health which reduces the possibilities of train wreckages attributed to poor health of the track,

  Enhancing passenger safety drastically
- Taxpayers money is protected since track management builds in safe guards for

  Rail assets.

Thank You

INDIAN RAILWAYS