

**Invited Talk**  
**on**  
**Integration of Technology and Road Engineering**

**By**

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**under the Theme**

**Adoption of Technologies for Better Traffic Management and  
Road Safety - How and What?**

**Organised by**

**International Road Federation (India Chapter)**

as part of ongoing Lecture Series 2.0 of IRF

30.08.2024

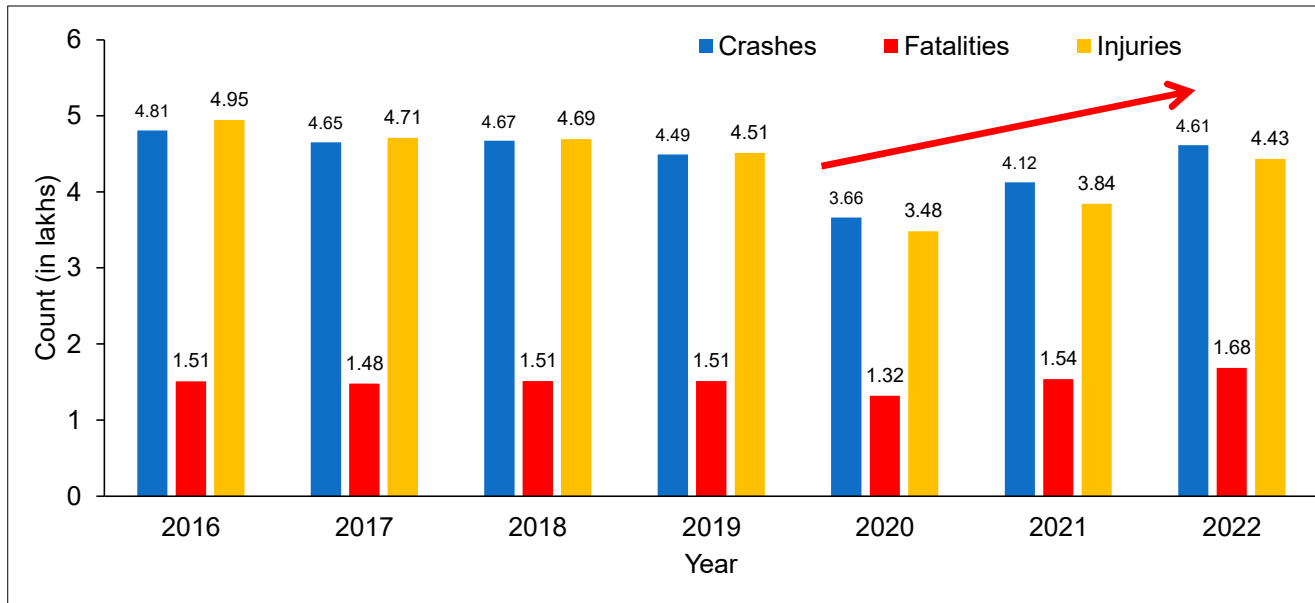
## Presentation Outline

- \* **Preamble & Significance of the Study**
- \* **About Project iRASTE: A Pilot Study**
- \* **Artificial Intelligence powered ADAS to tackle Road Safety**
- \* **Vehicle Safety Vector & Driver Safety Performance**
- \* **Mobility Safety Vector**
- \* **Infrastructure Safety Vector**
  - \* **Status of the iRASTE Blackspot Action Plan: Couple of Case Studies**
  - \* **Economic Benefit Assessment of Black Spot Improvements**
- \* **Education, Awareness Campaign and Emergency Care**
- \* **Overall Outcome of Project iRASTE**

# Preamble & Significance of the Study

- As per WHO, each year, 1.19 million global road fatalities result from road crashes, mainly affecting individuals aged between 5 to 29. Out of the above, 92 % occur in Low and Middle Income Countries (LMIC), despite the above countries have only 60 % of the world's vehicles.
- India has the dubious distinction of accounting for the maximum number of road fatalities *i.e.* 11 % road fatalities

**Indian road crash statistics: 2016 to 22**



## GLOBAL PLAN

DECADE OF ACTION FOR ROAD SAFETY  
2021-2030

The Global Plan describes what is needed to achieve that target, and calls on governments & partners to implement an integrated

### SAFE SYSTEM APPROACH

Safe road infrastructure

Safe vehicles

Safe road use

Post-crash response

**WHAT TO DO?**

UN General Assembly Resolution 74/299 declared a **Decade of Action for Road Safety 2021-2030**, with the target to reduce road traffic deaths & injuries

## BY AT LEAST 50%

during that period

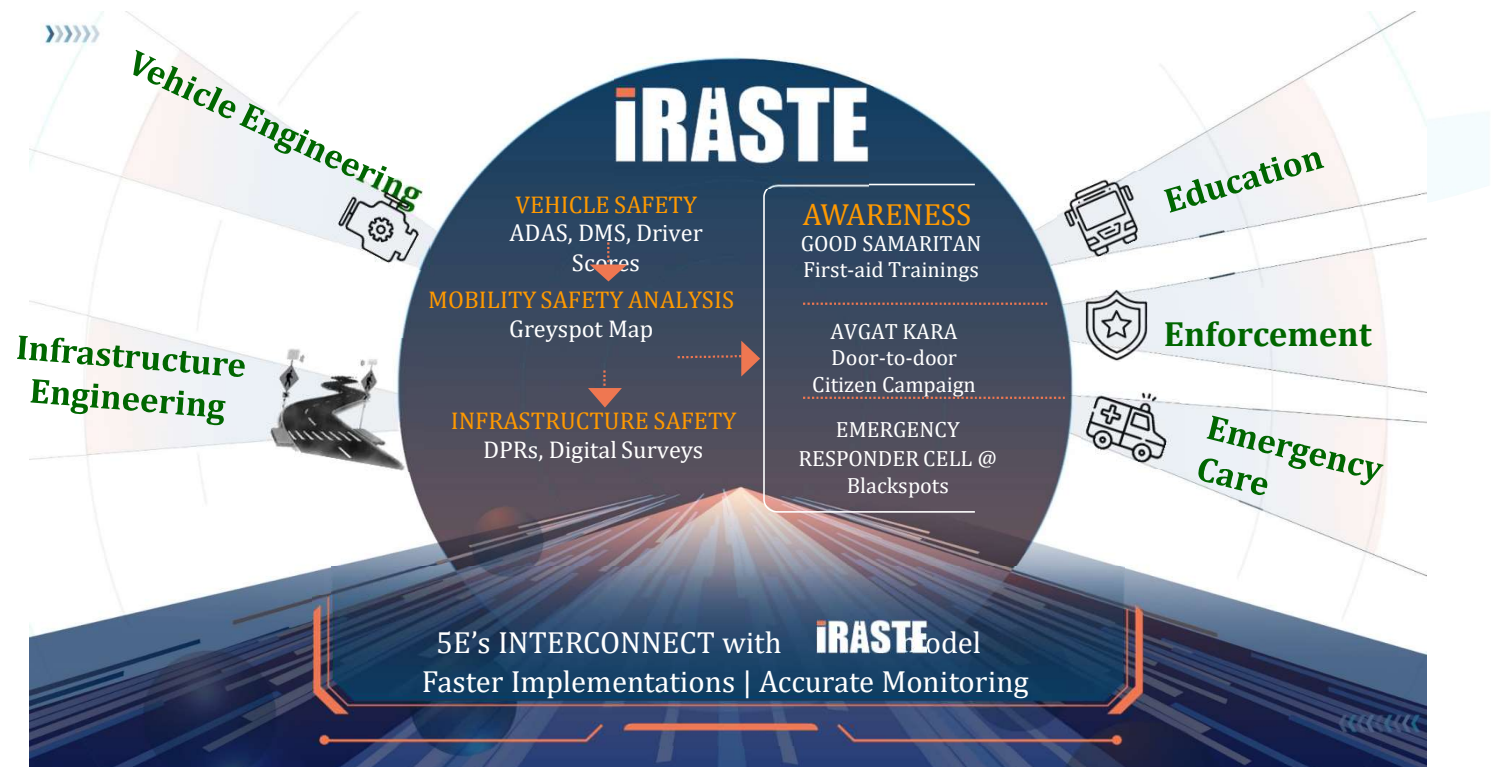
<https://www.who.int/teams/social-determinants-of-health/safety-and-mobility/decade-of-action-for-road-safety-2021-2030>

# About Project iRASTE: A Pilot Study

**Achievement of  
Global Plan is  
possible**

**Goal:**

Implementation of a holistic Safe Systems Approach for **up to 50 % reduction in road crashes / fatalities** by leveraging AI.



## Vehicle Safety:

**Improve safety of Buses through achieving  
safe driving behaviors by deploying Advanced Driver  
Assistance System (ADAS)**

# Deployment of AI-Powered Advanced Driver Assistance System (ADAS) to tackle Road Safety

Research has shown that driver alerts provided up to **2 seconds** prior to a risky situation can be life-saving

**ADAS\* Safety Alerts to Driver**

**Forward Collision Warning (FCW)**  
Improves driver alertness to forward collision events

**Pedestrian Collision Warning (PCW)**  
Improves driver alertness to vulnerable road users

**Headway Monitoring & Warning (HMW)**  
Helps driver maintain safe distance from the vehicle ahead

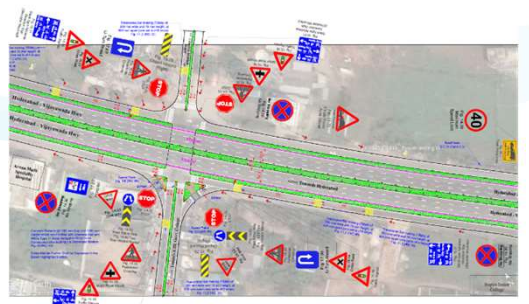
**Lane Departure Warning (LDW)**  
Promotes lane discipline (use turn indicator before changing lanes)

## Vehicle Safety ADAS + Driver Trainings

Camera focused on road  
Display unit (audio + visual alerts)



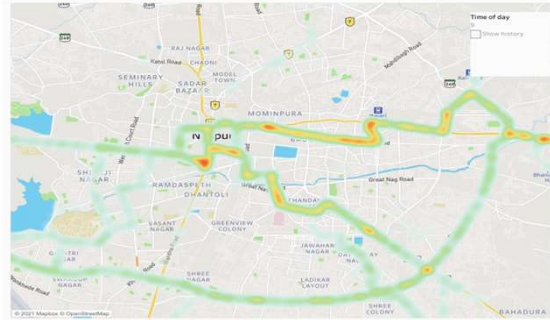
## Infrastructure Safety Blackspots Improvement Plan



## Social Awareness City Wide Campaigns



## Mobility Analysis Greyspot Map

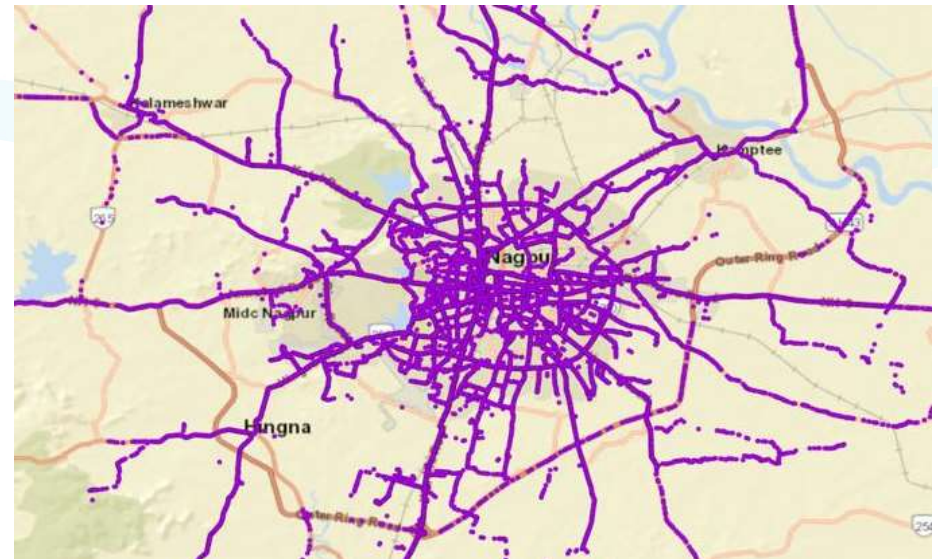


# Vehicle Safety: Improve safety of Buses through achieving safe driving behaviors by deploying ADAS

AI-based safety technology: A new approach to driver skilling



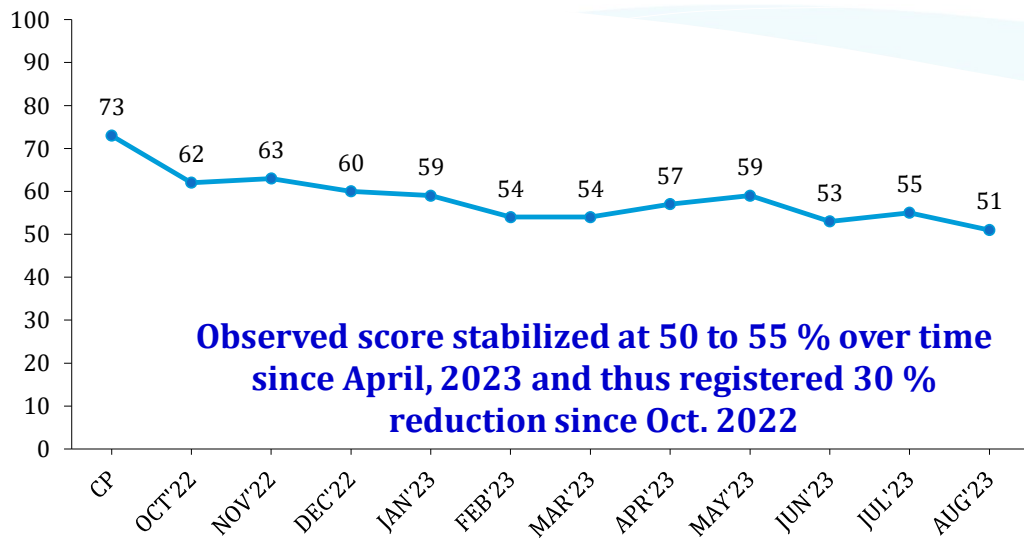
Coverage of ADAS Bus Fleets in Nagpur city



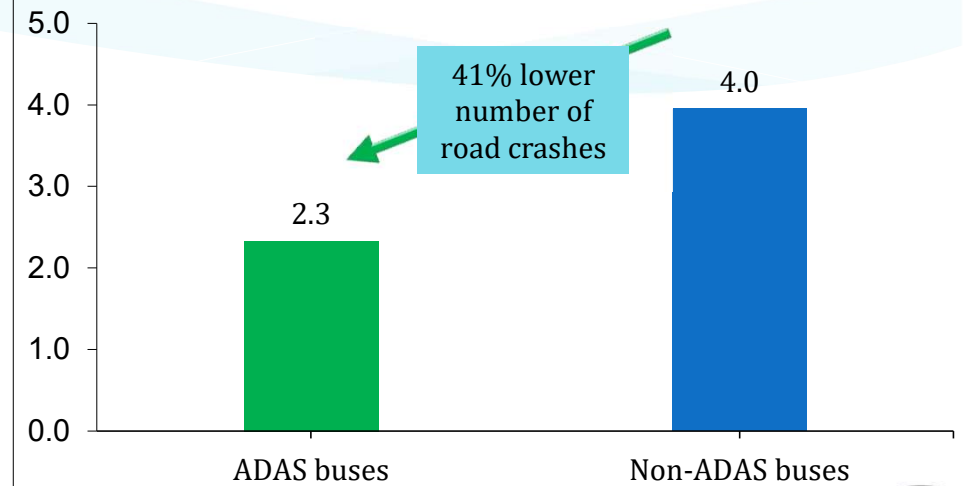
- **Project: iRASTE** is now India's largest and longest running study on ADAS for commercial vehicles.
- Additionally, operator risk score is tracked monthly and there has been a 31 % reduction in risk score since the start of the study. This represents a major upgrade in driver skilling.
- 1337 drivers of Nagpur Municipal Corporation (*NMC*) including school bus drivers were trained on Defensive Driving coupled with the features of ADAS.
- 207 safety champions were awarded for adherence to ADAS alerts.

# Summary of Driver Safety Performance of Nagpur Municipal Corporation (NMC) Bus Fleets

**Trend of the Risk Score registered from the Drivers who are running the ADAS installed NMC buses**



**Comparison of Road Crash Scenario per 50 buses: ADAS vs Non-ADAS January to August, 2023**



**• Further, the incidence of road crashes in ADAS installed buses registered 41 % decline since its full-scale deployment in 2023 covering 200 ADAS buses as compared to 250 non-ADAS installed buses.**

\*ADAS: Driver display unit of ADAS safety device →





**Mobility Safety:**  
**Proactive identification of probable**  
**road crash prone locations**  
*i.e. Greyspots*

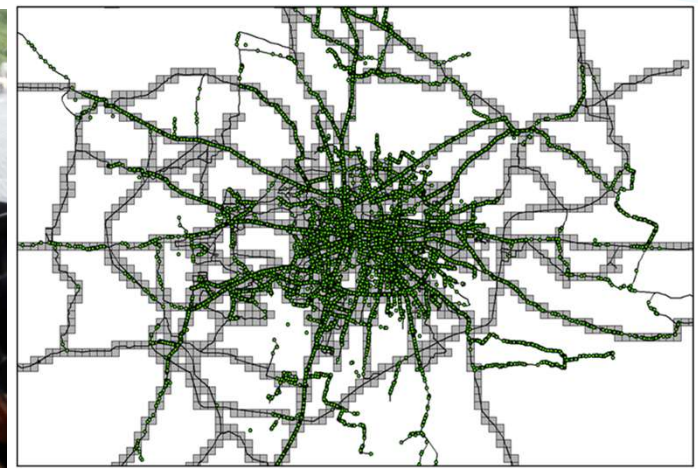
# Mobility Safety: Proactive identification of probable road crash prone locations, *i.e. termed as Greyspots*

## GREYSPOTS:

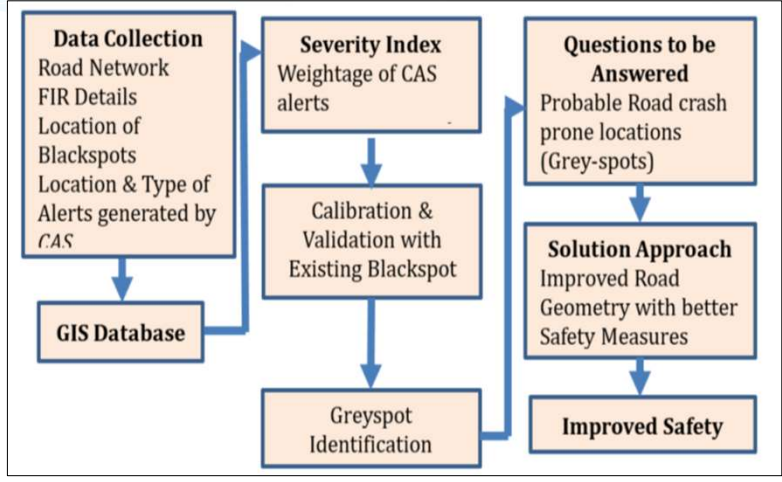
Identification of locations on road network, which have a potential to become Blackspots in the foreseeable future, if no corrective road safety measures are taken at these locations to prevent road crashes



ADAS devices installed in NMC Bus Fleets



Alerts generated from vehicles with ADAS devices



Study Methodology

**Accurate and more scalable than manual surveys**

# Model for Greyspot Identification

## 1. Intersection model: Can be Used in Identifying the Greyspots at the intersections area.

$$\text{Severity Index (SI)} = 1.03 * n_{3\text{arms}} + 0.814 * n_{4\text{arms}} + 2.281 * n_{\text{SumRoads}} + 1.34 * n_{\text{FCWspeed}} + 1.27 * n_{\text{PCWspeed}}$$

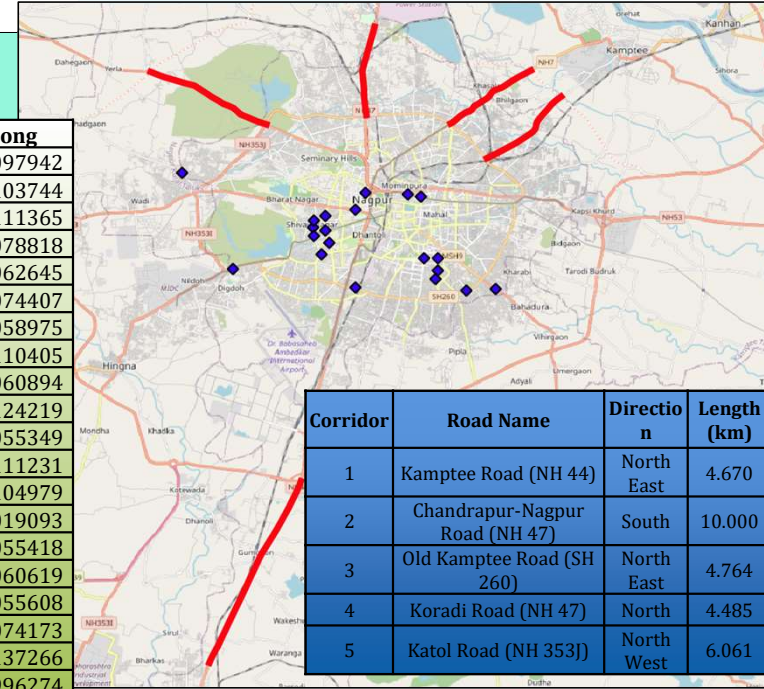
**AICc Value**  
236

Static variables

Dynamic variables

## 2. Midblock model: Used in Identifying the most unsafe corridors

$$\text{Severity Index (SI)} = -93.567 * \text{TimeGap (b/w alerts)} + 79.574 * \text{Speed (b/w alerts)} + 3.680 * \text{RoadWidth}$$



**Greyspots and Top 5 most unsafe corridors identified (Based on the analysis of ADAS data for Quarters 1 2 and 3 in 2023 and the developed greyspots):**

S. No.	Location name	lat	Long
1	Gitanjali Square	21.152096	79.097942
2	Agrasen Square	21.150943	79.103744
3	Raghuji Nagar (Chota tajbagh chowk)	21.123422	79.111365
4	RBI Square	21.152658	79.078818
5	Bajaj nagar square	21.130229	79.062645
6	Bardi, Civil lines (Maharajbagh chowk)	21.145244	79.074407
7	Sir visweswarraya square	21.124952	79.058975
8	Shishu mandir school, old kailash nagar	21.113882	79.110405
9	Coffee house intersection	21.142358	79.060894
10	Powerhouse chowk	21.108898	79.124219
11	Shivaji Nagar (Ramnagar chowk)	21.137011	79.055349
12	Ayodhya Nagar Square	21.117775	79.111231
13	Tukdoji Putla Square	21.12335	79.104979
14	Bhagat Square	21.118545	79.019093
15	Ram nagar to Chota ram nagar	21.140332	79.055418
16	Shankar nagar square	21.135921	79.060619
17	Gandhi nagar square	21.133362	79.055608
18	Chatrapati Hall, Somalwada	21.110287	79.074173
19	Atul Lawn, Dighori	21.109586	79.137266
20	Khadgaon Road Gajanan Mandir	21.161838	78.996274

### Greyspot Map: Potential future Black spots

- ❑ New AI-based data approach to predict Potential Black spots, Current Black spots, & Improved spots
- ❑ Accurate, automated and more scalable than manual surveys
- ❑ Enables precise & prompt interventions in Enforcement and Emergency Care

# Infrastructure Safety: Improvement of the Black Spots

# Infrastructure Safety



\*\*\* MoRT&H Protocol for Blackspot was followed as the study done in 2021

- Location wherein either 5 road crashes or 10 fatalities occurred within 500 m distance during the last 3 calendar years identified as a black spot.
- Using the above, Out of the 117 listed road crashes, top 38 Blackspots (8 midblock locations, 30 intersections) in the city identified for devising relevant engineering strategies.

[as per Ministry of Road Transport and Highways (MoRT&H) protocol\*\*\*]



Source: FIR data collected from Nagpur Police

Concerned authority	Count of Blackspots
NH PWD	18
NHAI	3
NMC	5
PWD (State division)	4
World Bank (PWD)	8

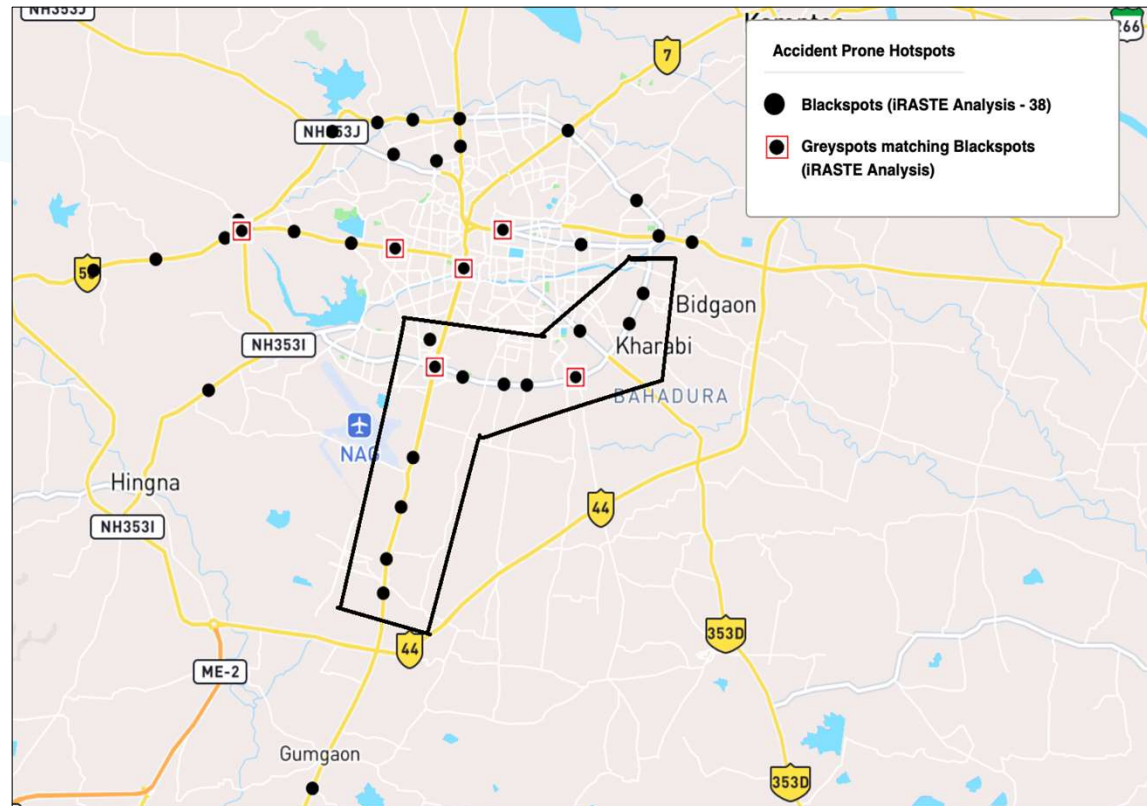
# Details of 38 Blackspots in Nagpur

S. No.	Blackspot location name	Latitude	Longitude	Road section type
1	8th mile	21.14415	78.97213	Intersection
2	Auto HUB to Toll Naka	21.15352	79.00419	Intersection
3	Ayapa Mandir to Gorewada Square	21.18733	79.06241	Mid Block
4	Campus Intersection (Nagpur University Campus)	21.14911	79.04082	Intersection
5	Chatrapati Square	21.11083	79.07011	Intersection
6	Chinchbhavan Square	21.0675	79.05833	intersection
7	Chikli Square	21.1623	79.14106	Intersection
8	Dattawadi Square	21.15075	78.99644	Mid Block
9	Dongargaon	20.98047	79.02711	Mid Block
10	Dongargaon to Bothali	21.05141	79.05312	Intersection
11	Gittikhadan to Dinshaw	21.17656	79.05564	Mid Block
12	Gorewada to Toll Naka	21.18361	79.03417	Intersection
13	Jinga Bai takli to Zhanda Chowk	21.18761	79.07888	Intersection
14	Juni Pardi Naka Chowk	21.15139	79.14889	Intersection
15	Khandghav Turning	21.15621	79.00116	Intersection
16	Kharbi Chowk	21.12425	79.13848	Intersection
17	Mhalgi Nagar Square	21.10766	79.11961	Intersection
18	Mahesh Dhaba	21.04082	79.052	Mid Block
19	Manewada Square	21.10522	79.10247	Intersection
20	Maruti Seva Square, Amravati Road	21.15271	79.02068	Intersection

21	Maruti Seva Square, Kamptee Road	21.18391	79.11693	Intersection
22	Mayo Square	21.15317	79.09403	Intersection
23	NEERI Point	21.11933	79.0684	Intersection
24	New Toll Naka to Toll Naka	21.1864	79.04997	Intersection
25	Pagalkhana Square to Manakapur Square	21.17908	79.07912	Mid Block
26	Police Talawe	21.17454	79.07071	Intersection
27	Prakash High School	21.14944	79.16056	Mid Block
28	Rajiv Nagar intersection	21.10365	78.99068	Intersection
29	Ravi Nagar	21.14744	79.0562	Intersection
30	Shitala Mata Square	21.12194	79.12111	Intersection
31	Shivanghav Fata	21.08285	79.06251	Intersection
32	Shrinagar Chowk	21.10771	79.07994	Intersection
33	Telephone Exchange to C.A road	21.1487	79.12154	Mid Block
34	Veerghav Square (Omkar Nagar)	21.10549	79.09442	Intersection
35	Wadhamna	21.14072	78.95026	Intersection
36	Wadi T point (Dhamna)	21.15287	79.00227	Intersection
37	Wathoda Square	21.13361	79.14333	Intersection
38	Zhansi Rani Square (2)	21.14124	79.08029	Intersection

## Improvement of the Blackspots

- Analyzed 117 listed spots from all sources & identified **38 Blackspots**.
- Detailed Project Report (*DPRs*) for all the 38 locations were prepared and submitted in September 2022 to the five stakeholders who are manning the Nagpur Metropolitan Region namely, *NHAI, NMC, PWD -SR, PWD-NHAI, PWD-WB*)
  - 8 Blackspots were identified on priority for implementation of some of the remedial measures.
  - 20 % to 40 % speed reduction were observed with the implementation of Transverse Bar Markings (*TBM*s)
- Wadhamna Intersection Blackspot.**
- Economic - Benefit Cost Assessment** was done for 4 locations; Estimates show that **66 % reduction in road crashes & 40 % reduction in fatalities** can be achieved if all the recommended measures are implemented.

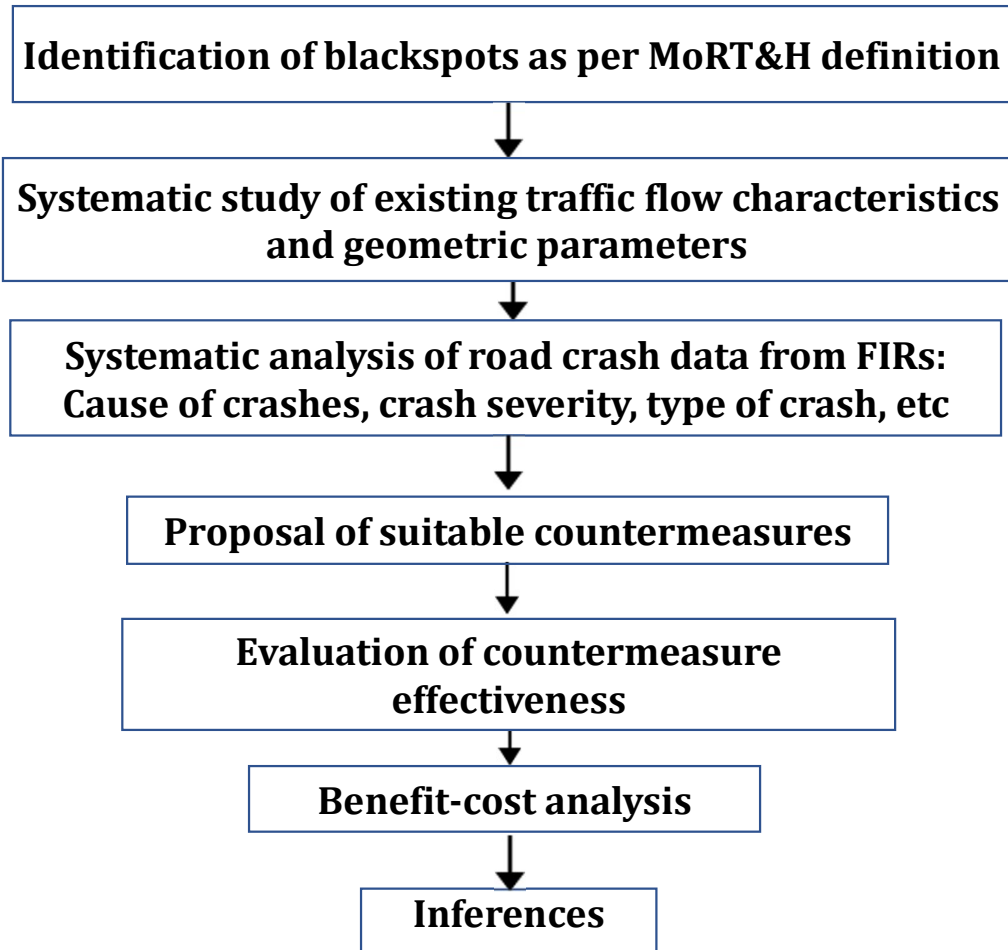


**Focus Area for Blackspot Improvement & Awareness Programs**

# Economic Benefit Assessment of Black Spot Improvements



## Methodology:





## Benefits of Black Spot Treatment

- The proposed countermeasures were found to be cost effective for the four blackspots conforming to IRC: SP-131 (2022).
- About 60 to 66 percent reduction in the overall road crashes coupled with 40 % reduction in fatalities if the countermeasures are implemented.
- Economic Internal Rate of Return (*EIRR*) was found to be ranging between 54 % - 66 % through the analysis period of 5 years - **A significant return on investment (ROI).**
- Even the First Year Rate of Return (*FYRR*) was estimated to be ranging between 1.42 % - 2.76 %, **which shows that there is bound to be an immediate ROI.**

# 01.0 Study Area: Chattrapathi Shivaji Square



## Bird's Eye View



## Ground View Before Implementation



# 01.0 Chattrapathi Shivaji Square (Contd...)

## A Glimpse of the Design

Infrastructure Safety (Contd..)



**CSIR**  
**CRRI**



## Ongoing construction Activities as per the Design



## 01.0 Chattrapathi Shivaji Square (Contd...)

Before:



- We have been able to reclaim the residual spaces and reducing the pedestrian crossing distance and larger channelizers for vehicles also elongated traffic islands for traffic control.
- Extended the dividers for easier traffic movement at the junction.
- We reclaimed the extra spaces on the sides of the road and turned them into organized parking, cycle track, wider footpaths and green spaces etc.
- **Construction of Table top for safer movement of Pedestrians at the Free Left Turns are under progress.**

After:



## 02.0 Study Area: Ajni Square Bird's Eye View

Infrastructure Safety (Contd..)



## Ground View Before Implementation

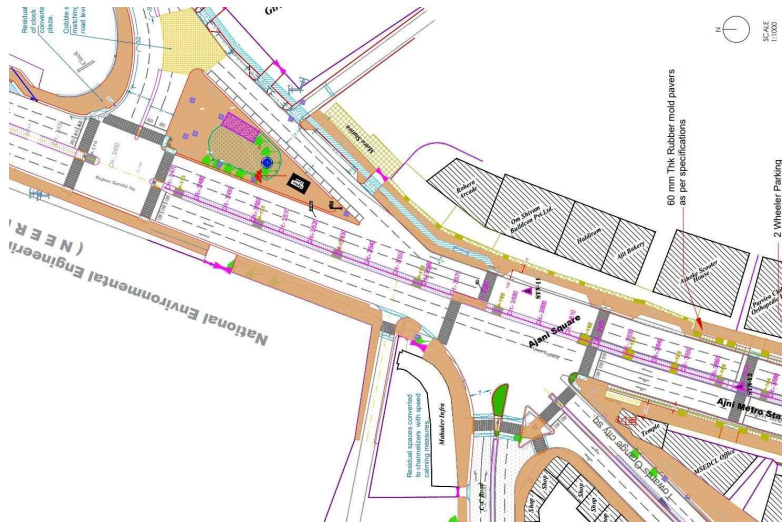


## 02.0 Ajni Square (Contd...) Infrastructure Safety (Contd.)

### A Glimpse of the Design



**CSIR**  
**CRRI**



## Ongoing construction Activities as per the Design



## 02.0 Ajni Square (Contd...)

Before:



Improper traffic and pedestrian movements

- We have been able to reclaim the residual spaces and reducing the pedestrian crossing distance and larger channelizers for vehicles.
- Also Introducing traffic islands for traffic controls.
- We have introduced table top slip lanes for safer left turns. Introducing dividers for easier traffic movement at the junction.
- We reclaimed the extra spaces on the sides of the road and turned them into organized parking, cycle track, wider footpaths, green spaces and public sitting spaces with proper lightings.
- **Construction of Table top for safer movement of Pedestrians at the Free Left Turns are under progress.**

Infrastructure Safety (Contd..)



**CSIR**  
**IRRI**

After:



Regulated traffic movement



Provision of Footpath coupled with restoration of Rest Space which is provided at about 200 m away from the intersection

## 03.0 Study Area: Jaiprakash Nagar Square Bird's Eye View

Infrastructure Safety (Contd..)



## Ground View Before Implementation



Project  
**IRASTE**

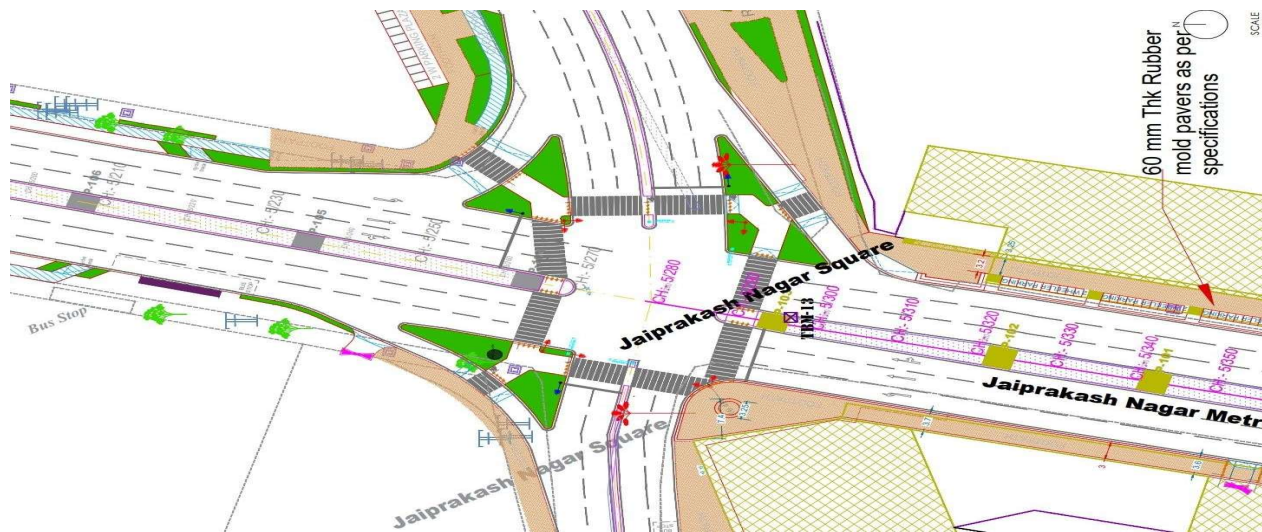


### 03.0 Jaiprakash Nagar Square (Contd...)

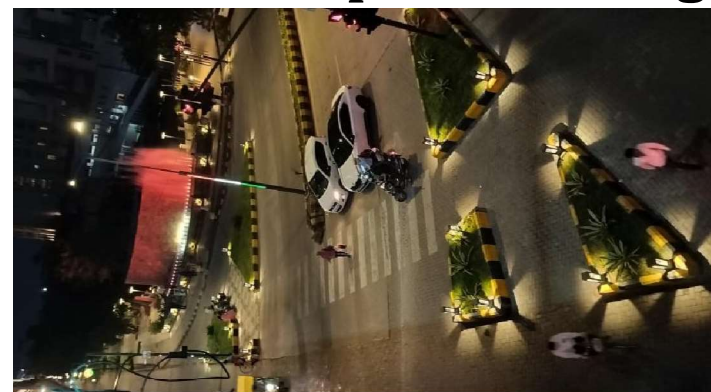
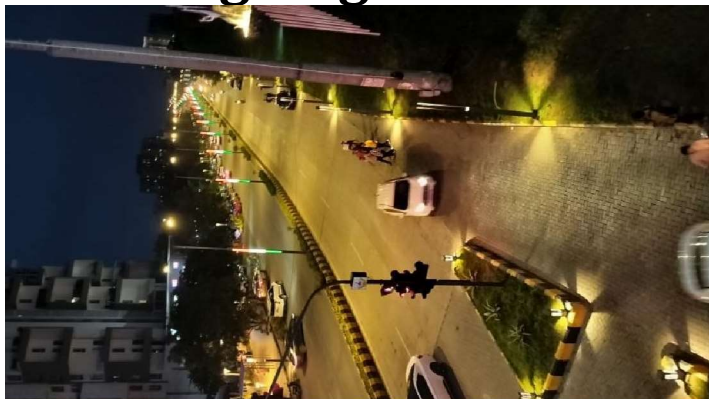
Infrastructure Safety (Contd..)



## A Glimpse of the Design



## Ongoing construction Activities as per the Design



## 03.0 Jaiprakash Nagar Square (Contd...)



Before:



- Here too reclaiming the residual spaces and reducing the pedestrian crossing distance and larger channelizers for vehicles has been achieved.
- Re oriented the dividers for easier traffic movement at the junction.
- Provide speed calming premises and Road Signs and Road Markings.
- Reclaimed the extra spaces on the sides of the road and turned them into organized parking, cycle track, wider footpaths and green spaces etc.
- Provided minimum of 40 Lux of Street lighting illumination and recreate public spaces.
- **Construction of Table top for safer movement of Pedestrians at the Free Left Turns are under progress.**

After:



# Nagpur-Amravati National Highway (NH 53): Safety Interventions

Near Wadhamna Intersection: 6 fatalities, 9 Injuries, and 18 Crashes during the last 4 years from 1.1.2019: Hence identified as a Blackspot



📍 Wadhamna Intersection at NH-53, Amravati Rd: Listed as a Black Spot



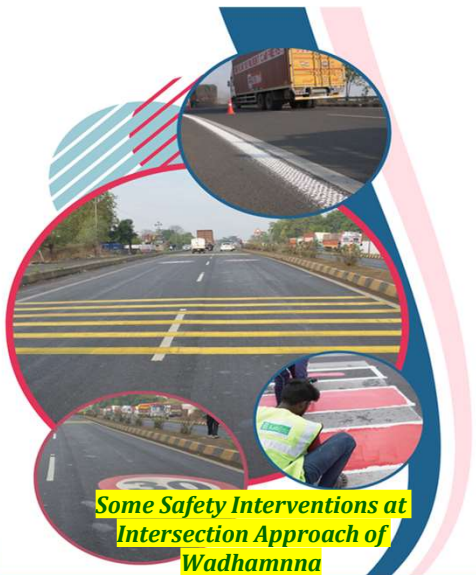
📍 Horizontal Curved section, 900 m away from the Wadhamna Intersection @ NH 53 @ Surabardi.



Hazard Markings At the Intersection Approach



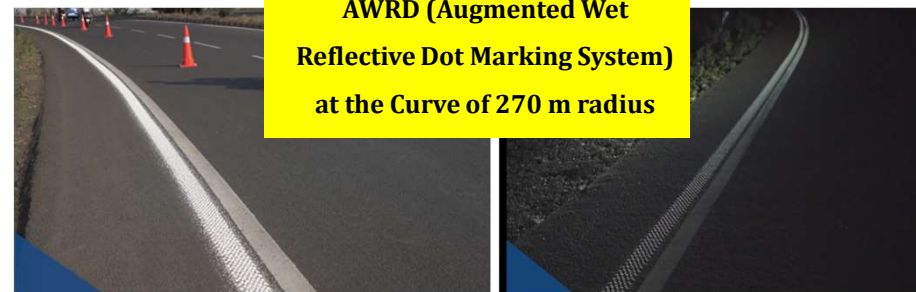
At the Horizontal Curved Section



Some Safety Interventions at Intersection Approach of Wadhamna



Drone Shot: Post application of safety measures at Wadhamna Intersection



AWRD (Augmented Wet Reflective Dot Marking System) at the Curve of 270 m radius



Transverse Bar Marking (TBM) Specification

No. of Strips per set	Thickness	Location from Hazardous zone (intersection)
6	5 mm	180 m
6	10 mm	120 m
6	15 mm	80 m
6	20 mm	50 m
9	20 mm	25 m

### 04.3 Post pilot safety implementations:

#### Reduction in speed with the corresponding TBM thickness



Speed in Km/h

Vehicle Type	85 <sup>th</sup> %ile Speed (in Km/h) Pre-Scenario: Towards Amaravati direction		Speed in Km/h (85 <sup>th</sup> percentile) Post Scenario -Towards Amaravati direction				
	Near median opening	100 m away from median opening	5mm TBM	10 mm TBM	15 mm TBM	20 mm TBM (6 strips)	20 mm TBM (9 strips)
<b>2-Wheelers</b>	<b>58</b>	<b>55</b>	<b>45</b>	<b>37</b>	<b>33</b>	<b>38</b>	<b>27</b>
<b>% reduction</b>	<b>-</b>	<b>-</b>	<b>18.2</b>	<b>32.7</b>	<b>43.1</b>	<b>34.5</b>	<b>53.4</b>
<b>Small Cars</b>	<b>67</b>	<b>66</b>	<b>61.0</b>	<b>56</b>	<b>47</b>	<b>50</b>	<b>39</b>
<b>% reduction</b>	<b>-</b>	<b>-</b>	<b>7.6</b>	<b>15.2</b>	<b>29.9</b>	<b>25.4</b>	<b>41.8</b>
<b>Big Cars</b>	<b>62</b>	<b>67</b>	<b>60</b>	<b>56</b>	<b>47</b>	<b>55</b>	<b>47</b>
<b>% reduction</b>	<b>-</b>	<b>-</b>	<b>10.4</b>	<b>16.4</b>	<b>24.2</b>	<b>11.3</b>	<b>24.2</b>
<b>3-Wheelers</b>	<b>47</b>	<b>40</b>	<b>35</b>	<b>34</b>	<b>26</b>	<b>34</b>	<b>29</b>
<b>% reduction</b>	<b>-</b>	<b>-</b>	<b>12.5</b>	<b>15.0</b>	<b>44.7</b>	<b>27.7</b>	<b>38.3</b>
<b>*LCV</b>	<b>53</b>	<b>49</b>	<b>46</b>	<b>42</b>	<b>34</b>	<b>36</b>	<b>22</b>
<b>% reduction</b>	<b>-</b>	<b>-</b>	<b>6.1</b>	<b>14.3</b>	<b>35.8</b>	<b>32.1</b>	<b>38.5</b>
<b>**HCV</b>	<b>49</b>	<b>48</b>	<b>47</b>	<b>41</b>	<b>33</b>	<b>33</b>	<b>30</b>
<b>% reduction</b>	<b>-</b>	<b>-</b>	<b>2.1</b>	<b>14.6</b>	<b>32.7</b>	<b>32.7</b>	<b>38.8</b>
<b>Bus</b>	<b>64</b>	<b>61</b>	<b>56</b>	<b>52</b>	<b>47</b>	<b>53</b>	<b>47</b>
<b>% reduction</b>	<b>-</b>	<b>-</b>	<b>8.2</b>	<b>14.8</b>	<b>26.6</b>	<b>17.2</b>	<b>26.6</b>

## 04.8 Post pilot safety implementations: Noise Level Studies

- Pre-pilot safety implementation: Ambient noise level [62-66 dB(A)]
- Post-pilot safety implementation: Noise level increases with increase in TBM thickness

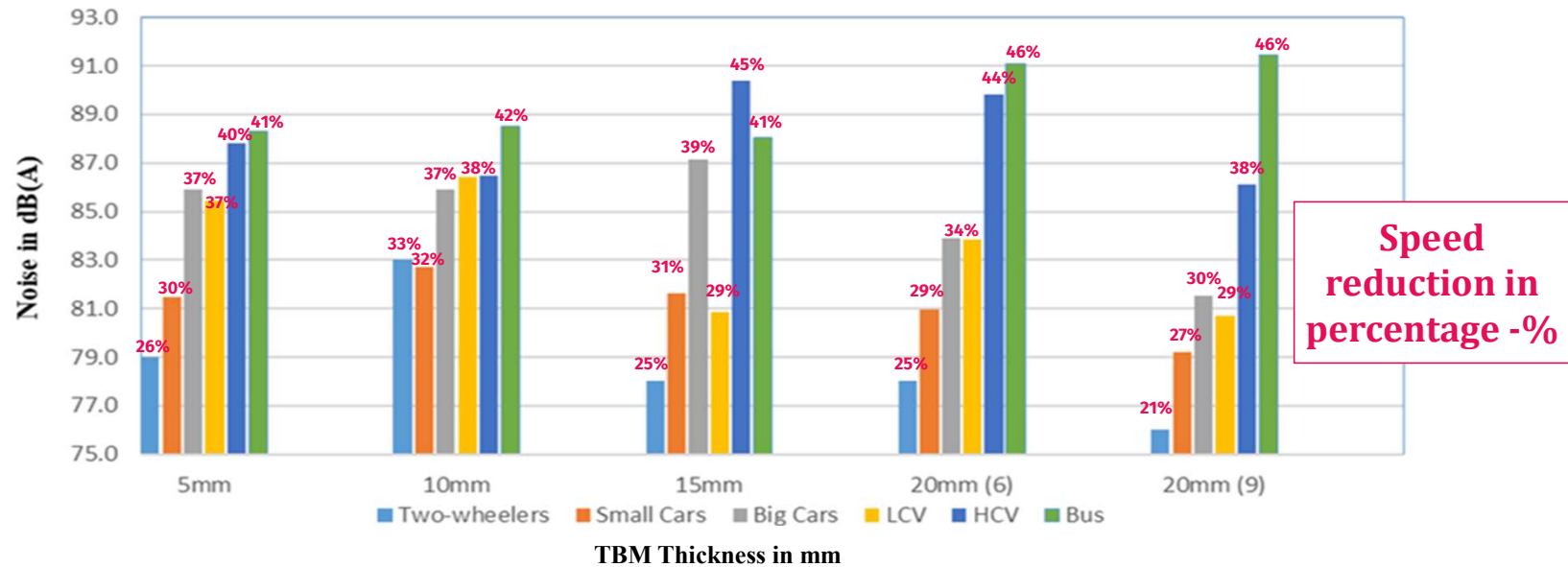
TBM Thickness (mm) and Number of Rows	Pre-pilot safety implementation Ambient Noise Level in (dB(A))		Post-pilot safety implementation Noise Level in (dB(A))					
	Morning	Evening	TW	SC	BC	LCV	HCV	BUS
5mm (6)	62.31	63.15	79	81.45	85.91	85.43	87.79	88.29
% increase	-	-	26.78	30.71	37.87	37.10	40.89	41.69
10mm(6)	62.31	65.40	83	82.7	85.9	86.41	86.48	88.5
% increase	-	-	33.20	32.72	37.85	38.67	38.78	42.03
15mm(6)	62.59	65.38	78	81.64	87.13	80.86	90.36	88.05
% increase	-	-	25.18	31.02	39.83	29.77	45.01	41.30
20 mm(6)	62.90	65.36	78	80.96	83.88	83.85	89.83	91.07
% increase	-	-	25.18	29.93	34.61	34.56	44.16	46.15
20mm(9)	62.90	66.20	78	80.22	83.55	83.69	89.12	91.43
% increase	-	-	21.97	27.13	30.87	29.49	38.21	46.73

29

**Project IRASTE** The values in brackets i.e. ( ) implies the number of rows / strips of TBMs deployed

## Speed reduction and the corresponding noise level

### Noise levels of different vehicle categories across varying TBM thickness



# Social Awareness

**Avagat Kara:** 30-day comprehensive public awareness program of 500 people in a locality assembled; Each participant took an oath to follow the traffic rules every day & to correct human errors. The program is expected to positive changes in terms of improving their driving behavior near Blackspot / Greyspot Locations.

**First Aid Training:** Traffic Police Station led community First Aid Training programs to train citizens in basic First Aid to assist accident victims.

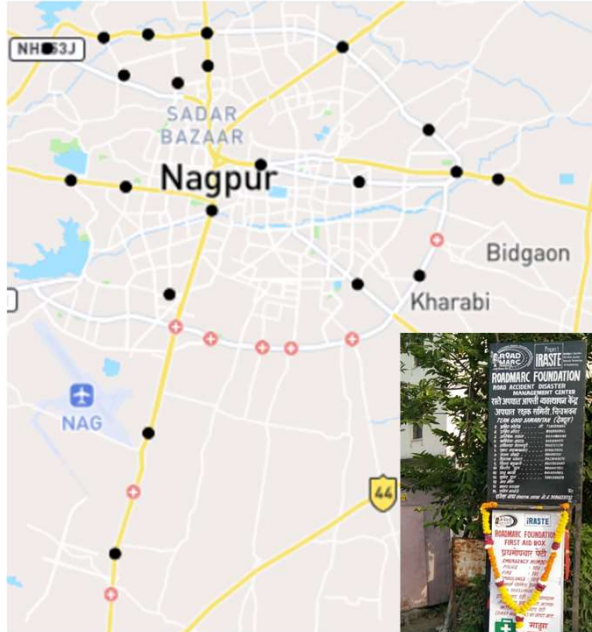
**Good Samaritan Event:** Held successfully on 10<sup>th</sup> July 2023 with the participation of 2000 attendees from various segments of society. All of them were trained on first aid and took an oath to follow traffic rules.



Date	Location
17/5/2023	M.I.D.C POLICE STATION
20/5/2023	SONEGAON POLICE STATION
22/5/2023	MAHINDRA & MAHINDRA
24/5/2023	KAMTHI POLICE STATION
25/5/2023	AJNI POLICE STATION
25/5/2023	BALTARODI POLICE STATION
28/5/2023	JANKI NAGAR MAHILA MANDAL

# Trystander Cells: Emergency Care

- **Trystander Cells installed at 8 Blackspot Locations**
- Each Cell has a First Aid Box and list of Volunteers (10-15) who can be called for Emergency Care.
- All Volunteers trained on how to handle Emergency situation during Golden Hour Situations





# Outcome of Trystander Cells

# Project: iRASTE Dashboard

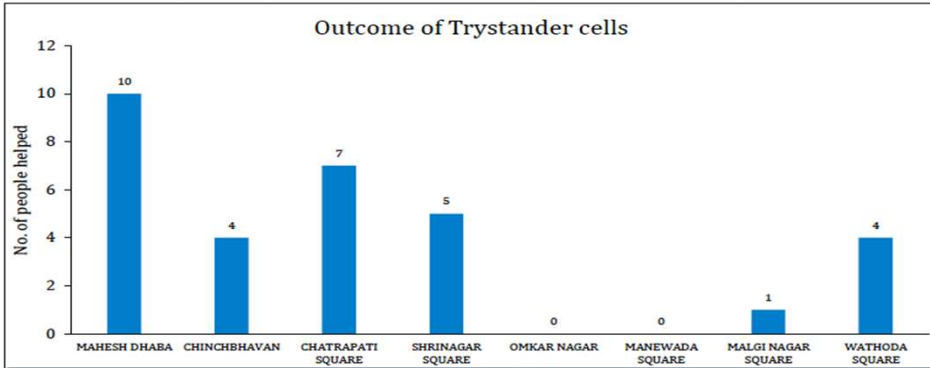
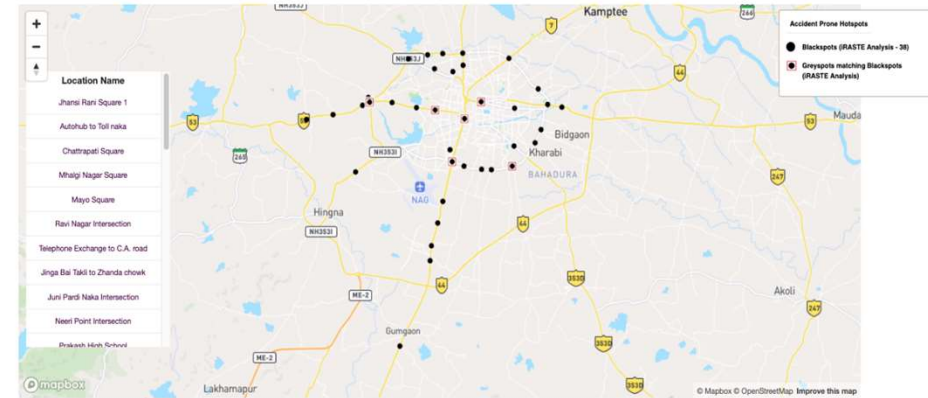
<https://inaix.iiit.ac.in/nagpur-iraste/dashboard>

No	Blackspot Location	DATE OF OPENING	No of People who attended the Inaguration	No of people Registered for screening	No of Good Samaritans who are available to help	No of Accident victims helped	Type of Help provided
1	MAHESH DHABA	22-Jul-23	62	206	13	10	Major Accident provided First Aid & Admitted to Hospital
2	CHINCHHAVAN	10-Aug-23	77	152	15	4	Major Accident provided First Aid & Admitted to Hospital
3	CHATRAPATI SQUARE	28-Aug-23	55	272	17	7	Minor Accidents Provided First Aid Only.
4	SHRINAGAR SQUARE	28-Nov-23	58	280	14	5	3 Minor Accidents And 2 Major Accidents where Admitted to Hospital
5	OMKAR NAGAR	10-Nov-23	73	230	15	0	
6	MANEWADA SQUARE	24-Nov-23	78	280	14	0	
7	MAHALGII NAGAR SQUARE	10-Nov-23	82	250	17	1	
8	WATHODA SQUARE	05-Nov-23	68	180	13	4	Minor Accidents Provided First Aid . And One was Admitted to Hospital



## Blackspots

Blackspots are the locations wherein either 5 road crashes or 10 fatalities were occurred within last 3 calendar years. Project iRASTE team utilized a three year period of road crash data extending from year 2018 to 2020 as per MoRT&H Protocol, 2015, and identified 38 blackspots that includes 28 intersection locations and 10 midblock locations. Hover on each of the locations and click links to know more details about the blackspots.



- Since Aug 2023, Trystander Cells in these 8 Blackspot Locations attended 31 road crash victims which happened in the vicinity of the identified Black Spots / Grey Spots of Nagpur roads.

## Overall Summary of iRASTE: Nagpur and Way Forward

### • **Vehicle Safety:**

- ✓ 250 vehicles equipped with CAS devices; 1340 drivers trained in Defensive driving & ADAS spread over 4 training programs
- ✓ 90 % of drivers in ADAS-enabled buses have shown sustained improvement in safe driving behavior.
- ✓ 41 % reduction in road crashes observed in the lead operator (*Hansa Travels*)

### • **Mobility Analysis:**

- ❑ Identified 19 Greyspots *i.e. Potential future blackspots* based on AI & data insights and given remedial measures
- ❑ Meeting with DCP Traffic sensitizing them for enhancement

### • **Infrastructure Safety:**

- ✓ All the 38 DPRs submitted in September, 2022 and round table chaired by Commissioner, NMC was held in June, 2023.
- ✓ Before and After Videos for 2 spots, Economic Impact Assessments for 4 spots for showcasing to stakeholders.
- ✓ Implementation of the remedial measures are in progress at 3 locations plus partial implementation at Waddhamna Intersection

### • **Awareness:**

- ✓ Eye camp & spectacle distribution conducted for 600 NMC drivers
- ✓ Completed Pilot awareness programs at Greyspot and Blackspot.
- ✓ Sustained Social Media Campaign

### • **iRASTE: Telangana**

- ✓ 200 plus buses ADAS equipped + 10 buses DMS equipped: **Final report submitted in May 2024**
- ✓ Four driver training programs imparted
- ✓ Focus on insights for driving behaviour on highways & ADAS + Driver Monitoring System (*DMS*) based insights for “near miss road crashes”

## Project: iRASTE Nagpur team

### Principal Investigators (PI):

- **Dr. S. Velmurugan**, CSIR - CRRI, Project Coordinator
- **Dr. Anbumani Subramanian**, INAI (*Applied AI Research Center at IIIT-Hyderabad*)
- **Prof. C.V. Jawahar**, IIIT-Hyderabad
- **Ms. Juby Jose**, Intel
- **Mr. Nirmal**, Mahindra & Mahindra Group
- **Mr. Konala Varma**, CEO, INAI - Overall Executive Coordinator

**Co-PIs: Dr. Mukti Advani, Sh.Dev. S. Thakur, Dr. K. Ravinder, Dr. A. Mohan Rao and Sh. Govind Krishnan, INAI, IIIT, Hyderabad**

**Members: (CSIR - CRRI):** Dr. Neelima Chakrabarty, Mr. Suhas Patil, Mr. Pritvi Jonnada, Ms. Kamini Gupta, Mr. Mohammad Akil, Mr. Sikander and Mr. Abhi Mandal and Dr. S. Padma

Thank You

Project  
**iRASTE**

Intelligent Solutions for  
Road Safety through  
Technology & Engineering

*A Mission to Reimagine  
Road Safety with the  
Predictive Power of AI*