



IDENTIFICATION AND PRIORITISATION OF BLACKSPOTS

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1. Background:

This document outlines a simple method as described in IRC 131:2022 to help the road-owning agencies identify and prioritise the accident blackspots across their respective jurisdiction. This exercise enables road agencies to plan a Blackspot Improvement Programme, which should be implemented in phases depending on available resources.

2. Importance of Identifying and Prioritising Blackspots:

The importance of identifying and prioritising blackspots is outlined below:

- **Safety Improvements:** By identifying blackspots, authorities can focus on making targeted improvements to reduce crashes and enhance road safety.
- **Resource Allocation:** Prioritising blackspots ensures that limited resources are used efficiently, directing funds and efforts to the areas where they will have the most impact.
- **Data-Driven Decisions:** Using crash data to identify blackspots leads to more informed and effective decision-making in road safety management.
- **Prevention of Future Crashes:** Interventions at blackspots can prevent future crashes, thereby saving lives and reducing injuries.
- **Compliance with Standards:** Identifying and addressing blackspots helps in meeting national and international road safety standards and regulations.
- **Economic Benefits:** Reducing crashes at blackspots can lower the economic costs associated with road crashes, including medical expenses, loss of productivity, and property damage.

3. What are Blackspots?

A blackspot is generally defined as a road section of 500 metres or a junction where the number of road crashes exceeds the Average Annual Total Crashes (AATC) calculated for the area under consideration.

To identify blackspots, the initial step is to pinpoint locations within the road network or corridor where crash numbers are above average. Given this variability in the highways, terrain, differing traffic volumes, compositions, speeds, and land use patterns, a uniform value for blackspot identification is not feasible. Instead, a state-specific criterion based on annual

average total crashes is used to determine blackspots, especially in the absence of high-quality, and reliable data.

4. Crash Data Collection

Crash data collection is managed exclusively by the police across all states, as they are authorised to register First Information Reports (FIRs) for legal purposes. This data, gathered during investigations, forms the basis for legal proceedings and insurance claims. Traditionally, many states have relied on manual FIRs, but since 2009, the Ministry of Home Affairs has been advancing the Crime and Criminal Tracking Network Systems (CCTNS) to automate and standardise FIR recording. Most states now maintain electronic FIRs in CCTNS, with some implementing GIS-enabled web-based systems conforming to IRC:53 or MoRTH guidelines. These GIS systems enhance crash location accuracy and enable comprehensive data analysis, supporting evidence-based road safety interventions.

5. How to Calculate Average Annual Total Crashes (AATC)?

To determine the Average Annual Total Crashes (AATC), follow this step-by-step process:

1. **Collect Three-Year Fatality Data:** Obtain data from official sources (e.g., MoRTH) for major road types in the state, including Expressways (if applicable), National Highways (NH), State Highways (SH), and Other Roads (OR).
2. **Gather Road Length Data:** Collect the lengths of these road types from the MoRTH official website.
3. **Calculate AATC per Kilometre:** Divide the total AATC over the three-year period by the respective road lengths to obtain AATC per kilometre (AATC/Km).
4. **Determine AATC for 500 Metres:** Convert AATC/Km to AATC for a 500-metre road length.
5. **Apply Multiplying Factors:** Multiply the AATC for 500 metres by suitable factors (ranging from 3 to 15, as described in Annexure-A) to derive the final AATC value for the specific state.

6. Setting Reaction Levels for Blackspot Identification

To identify blackspots, compare the actual number of road crashes in a 500-metre segment over the past 3 to 5 years with the Average Annual Total Crashes (AATC) specified in Annexure 1, which is state-specific and road category-specific. The reaction levels for blackspot identification are set as follows:

Determine Reaction Level:

- Compare the actual crash count with AATC.
- Reaction levels can be set at 3 times, 5 times, 10 times, or 15 times the AATC.

Classify Blackspots:

- **1st Order Blackspots:** Sections with crashes exceeding 15 times the AATC.
- **2nd Order Blackspots:** Sections with crashes between 10 to 15 times the AATC.
- **3rd Order Blackspots:** Sections with crashes between 5 to 10 times the AATC.
- **4th Order Blackspots:** Sections with crashes between 3 to 5 times the AATC.

Despite identifying various blackspots, prioritise them for action under the blackspot improvement program based on their severity and other factors.

7. Prioritisation of Blackspots for Treatment

Due to budget constraints, not all identified black spots can be rectified immediately. To align with available resources, the list of blackspots must be prioritised for treatment within a given financial year. This allows road agencies to plan and execute the blackspot improvement program in stages according to their budget.

Severity Indices

To prioritise blackspots effectively, assign severity scores based on the type of crashes:

- **Fatal Road Crashes:** 10 points
- **Serious Injury Crashes:** 5 points
- **Minor Injury Crashes:** 2 points
- **Damage Only Crashes:** 1 point

Formula

$$\text{Severity Index} = \{(Fatal Crashes \times 10) + (Serious Injury Crashes \times 5) + (Minor Injury Crashes \times 2) + (Damage Only Crashes \times 1)\}$$

A blackspot with a higher severity score should be given priority for treatment over others. For example, among 15 blackspots being considered for immediate action, rank them in descending order of severity score to determine the order of treatment.

Authorities have the discretion to adjust these severity indices based on their specific needs. They may choose to include or exclude certain types of crashes (e.g., damage-only crashes) in the prioritisation exercise. In cases where multiple blackspot locations have the same total severity score, all should be considered for treatment. Final decisions should reflect the available budget and other resource constraints, allowing flexibility in prioritisation.

8. Conclusion

In summary, identifying and prioritising accident blackspots is a crucial strategy for enhancing road safety and effectively utilising available resources. By following the method outlined in IRC 131:2022, road-owning agencies can systematically pinpoint and address high-risk locations, thus reducing the frequency and severity of road crashes. This process not only supports targeted safety improvements but also ensures that limited resources are allocated where they will have the greatest impact.

The outlined steps for calculating Average Annual Total Crashes (AATC) and setting reaction levels provide a structured approach to identifying blackspots. Prioritisation based on severity indices enables agencies to address the most critical areas first, aligning interventions with budget constraints and resource availability. Ultimately, this method facilitates data-driven decision-making, compliance with safety standards, and the prevention of future crashes, leading to significant economic and social benefits.

Annexure- A

STATE/UT	AATC/KM			3AATC/500m			5AATC/500m			10AATC/500m			15AATC/500M		
	NH	SH	ODR	NH	SH	ODR	NH	SH	ODR	NH	SH	ODR	NH	SH	ODR
Andaman and Nicobar Islands	0.25	0.21	0.64	0.37	0.32	0.96	0.61	0.53	1.61	1.23	1.07	3.21	1.84	1.60	4.82
Andhra Pradesh	1.28	0.91	0.31	1.92	1.36	0.46	3.20	2.27	0.76	6.40	4.55	1.53	9.60	6.82	2.29
Arunachal Pradesh	0.04	0.01	0.02	0.05	0.01	0.02	0.09	0.02	0.04	0.18	0.05	0.08	0.27	0.07	0.12
Assam	0.93	0.75	0.49	1.39	1.13	0.73	2.32	1.89	1.22	4.65	3.77	2.44	6.97	5.66	3.66
Bihar	0.76	0.56	0.26	1.14	0.85	0.40	1.90	1.41	0.66	3.80	2.82	1.32	5.70	4.23	1.99
Chandigarh	2.80	0.00	3.86	4.20	0.00	5.78	7.00	0.00	9.64	14.00	0.00	19.28	21.00	0.00	28.92
Chhattisgarh	1.21	0.73	0.56	1.82	1.09	0.84	3.03	1.82	1.40	6.05	3.63	2.81	9.08	5.45	4.21
Dadra and Nagar Haweli	0.00	0.37	0.32	0.00	0.55	0.48	0.00	0.92	0.81	0.00	1.83	1.61	0.00	2.75	2.42
Daman and Diu	0.14	0.09	0.71	0.20	0.14	1.07	0.34	0.23	1.78	0.68	0.45	3.55	1.02	0.68	5.33
Delhi	25.99	0.00	2.48	38.98	0.00	3.72	64.97	0.00	6.19	129.94	0.00	12.39	194.91	0.00	18.58
Goa	5.49	1.45	1.81	8.24	2.18	2.72	13.73	3.63	4.53	27.46	7.25	9.07	41.19	10.88	13.60
Gujarat	0.86	0.32	0.33	1.29	0.49	0.49	2.15	0.81	0.81	4.30	1.62	1.63	6.45	2.43	2.44
Haryana	1.52	1.67	0.19	2.28	2.50	0.29	3.80	4.17	0.48	7.60	8.34	0.97	11.40	12.51	1.45
Himachal Pradesh	0.55	0.91	0.32	0.83	1.36	0.49	1.38	2.26	0.81	2.77	4.53	1.62	4.15	6.79	2.43
Jammu and Kashmir	0.82	4.88	0.26	1.23	7.32	0.39	2.04	12.20	0.65	4.09	24.40	1.30	6.13	36.60	1.96
Jharkhand	0.68	1.26	0.18	1.01	1.89	0.27	1.69	3.15	0.45	3.38	6.31	0.90	5.07	9.46	1.36
Karnataka	2.11	0.57	0.35	3.16	0.85	0.53	5.27	1.42	0.88	10.55	2.84	1.75	15.82	4.26	2.63
Kerala	5.04	1.67	0.84	7.55	2.50	1.26	12.59	4.17	2.09	25.18	8.34	4.18	37.77	12.51	6.28
Lakshadweep	n.a	n.a	0.01	n.a	n.a	0.01	n.a	0.00	0.02	n.a	n.a	0.04	n.a	na	0.06
Madhya Pradesh	1.35	1.25	0.70	2.03	1.88	1.05	3.38	3.13	1.74	6.75	6.25	3.48	10.13	9.38	5.23
Maharashtra	0.63	0.22	0.17	0.94	0.32	0.26	1.56	0.54	0.44	3.13	1.08	0.87	4.69	1.62	1.31
Manipur	0.20	0.22	0.01	0.29	0.33	0.01	0.49	0.54	0.02	0.98	1.09	0.04	1.47	1.63	0.06
Meghalaya	0.22	0.13	0.04	0.33	0.20	0.06	0.55	0.34	0.10	1.10	0.67	0.19	1.65	1.01	0.29
Mizoram	0.03	0.11	0.01	0.04	0.16	0.01	0.06	0.26	0.02	0.13	0.53	0.04	0.19	0.79	0.06
Nagaland	0.18	0.11	0.01	0.27	0.16	0.01	0.46	0.27	0.02	0.91	0.53	0.04	1.37	0.80	0.06
Odisha	0.89	0.80	0.20	1.33	1.19	0.30	2.22	1.99	0.51	4.45	3.98	1.01	6.67	5.97	1.52
Pondicherry	13.45	0.00	1.52	20.17	0.00	2.28	33.62	0.00	3.80	67.24	0.00	7.59	100.86	0.00	11.39
Punjab	0.90	1.69	0.32	1.35	2.53	0.47	2.25	4.21	0.79	4.50	8.43	1.58	6.74	12.64	2.37

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	NH	SH	ODR	NH	SH	ODR	NH	SH	ODR	NH	SH	ODR	NH	SH	ODR
Rajasthan	0.85	0.23	0.51	1.27	0.35	0.77	2.12	0.59	1.29	4.25	1.17	2.57	6.37	1.76	3.86
Sikkim	0.17	0.10	0.03	0.26	0.15	0.05	0.43	0.26	0.09	0.85	0.51	0.17	1.28	0.77	0.26
Tamil Nadu	4.24	1.90	0.51	6.35	2.84	0.76	10.59	4.74	1.27	21.18	9.48	2.54	31.77	14.22	3.82
Telangana	1.82	1.50	0.56	2.73	2.25	0.83	4.55	3.76	1.39	9.10	7.51	2.78	13.65	11.27	4.16
Tripura	0.25	0.59	0.12	0.38	0.89	0.17	0.63	1.48	0.29	1.27	2.97	0.58	1.90	4.45	0.87
Uttar Pradesh	1.67	1.71	0.22	2.50	2.57	0.33	4.17	4.29	0.55	8.34	8.57	1.10	12.51	12.86	1.65
Uttarakhand	0.32	0.10	0.06	0.47	0.14	0.09	0.79	0.24	0.14	1.58	0.48	0.29	2.36	0.72	0.43
West Bengal	1.43	0.89	0.53	2.15	1.34	0.79	3.58	2.23	1.32	7.16	4.45	2.63	10.74	6.68	3.95