

Role of Infrastructure in Road Safety

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Understanding Infrastructure Safety

- Preventive vs. Reactive Strategies
- Advantages of Network Safety Management over Black Spot Management approach
- Individual vs. community risk
- Role of road agencies in managing the safety on their network
- Understand safety assessment tools like iRAP

Definition – Infrastructure Safety Management

A systematic approach to **improve** and **manage** road infrastructure safety by:

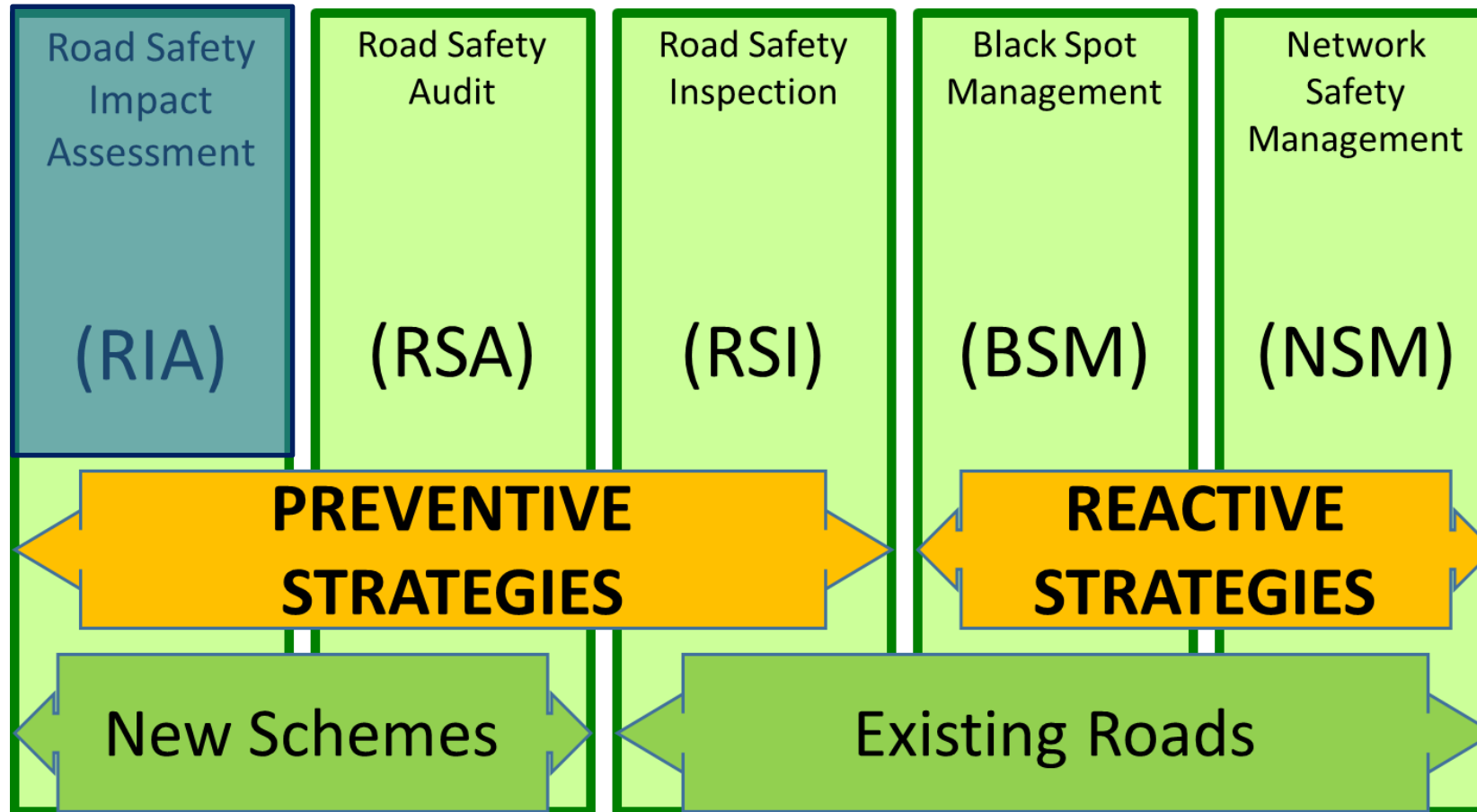
- Applying **PREVENTIVE** strategies
- Applying **REACTIVE** strategies
- Integrating safety in **all phases** of planning, design and operation of road infrastructure

Role of Road Agencies - Safety Quality Assurance

Assuring infrastructure safety quality requires a systematic response at three broad levels:

- 1. safety design standards and rules to provide appropriate protective features;*
- 2. Network safety Management tools to ensure design standards and rules are applied; and*
- 3. safety rating surveys to provide intermediate measures of likely safety outcomes and to underpin the preparation of 'mass action' programs to improve network safety ratings*

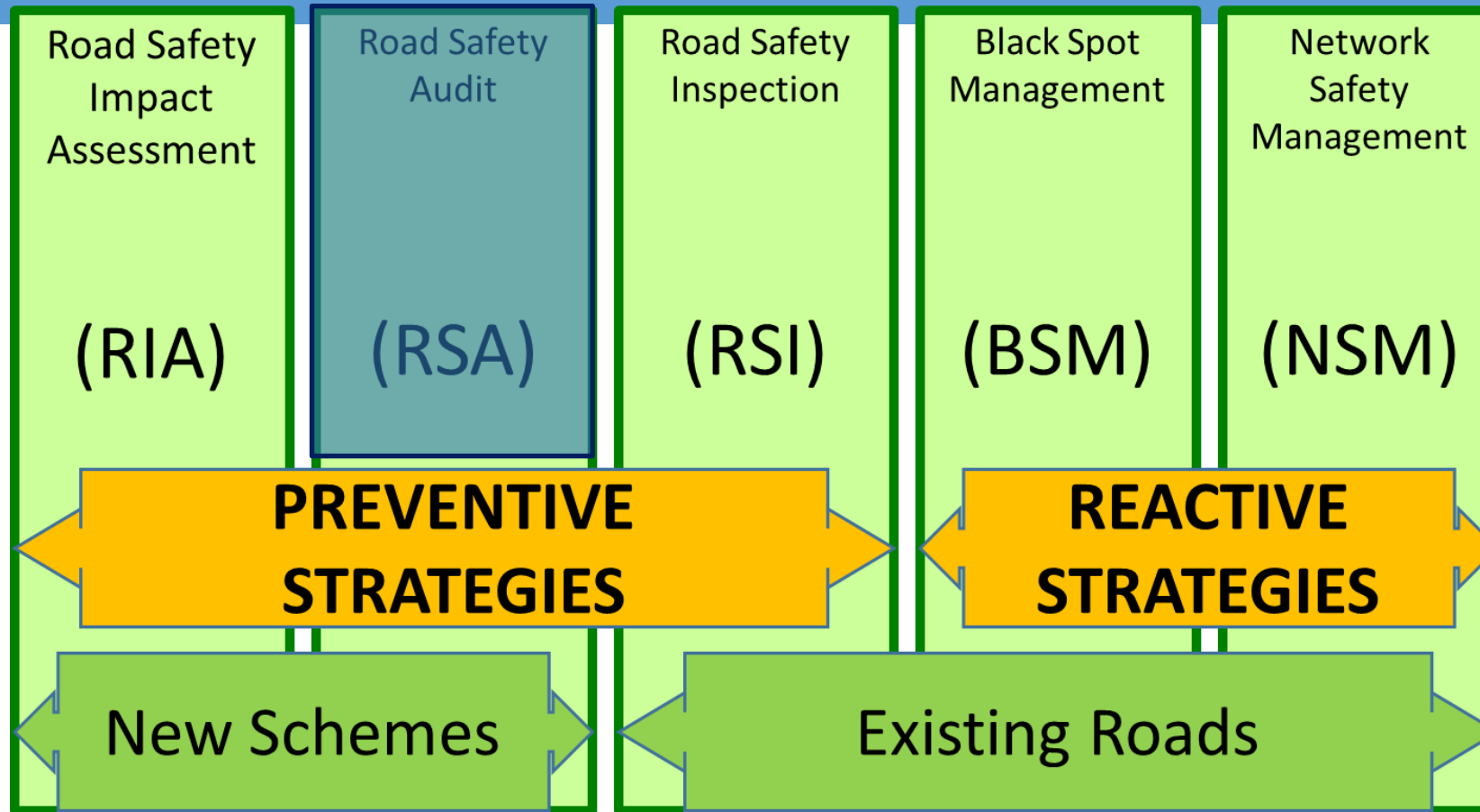
Approaches – Road Safety Impact Assessment



Road Safety Impact Assessment

- Identifies the likely effects of proposed roads or policy actions on safety at early stage of road investment planning
- Should preferably cover all planned interventions across whole road network
- Assesses the safety impact of investment and maintenance plans in the context of medium to long term Program or Master Plan
- Few countries are applying it systematically

Approaches – Road Safety Audit

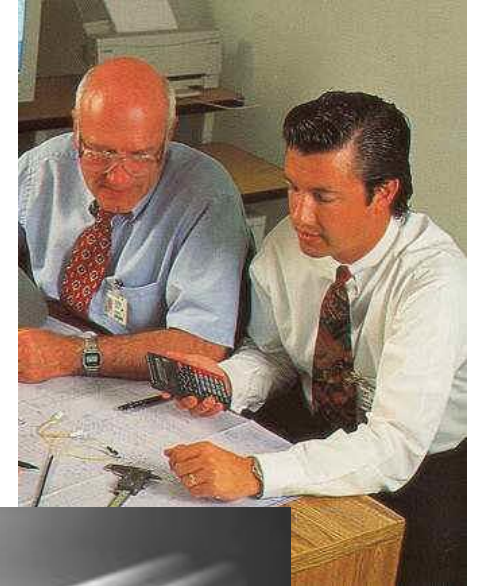


Road Safety Audit

A systematic procedure to integrate road safety knowledge into road design or road improvement in order to reduce the risk to which road users are submitted

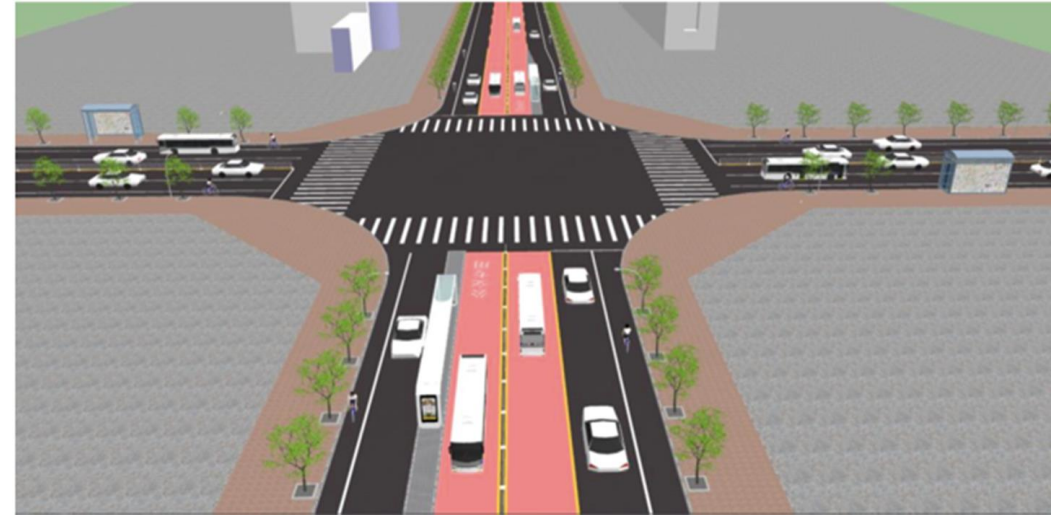
Look beyond compliance with design standards

A formal evaluation carried out by independent authorities and trained experts

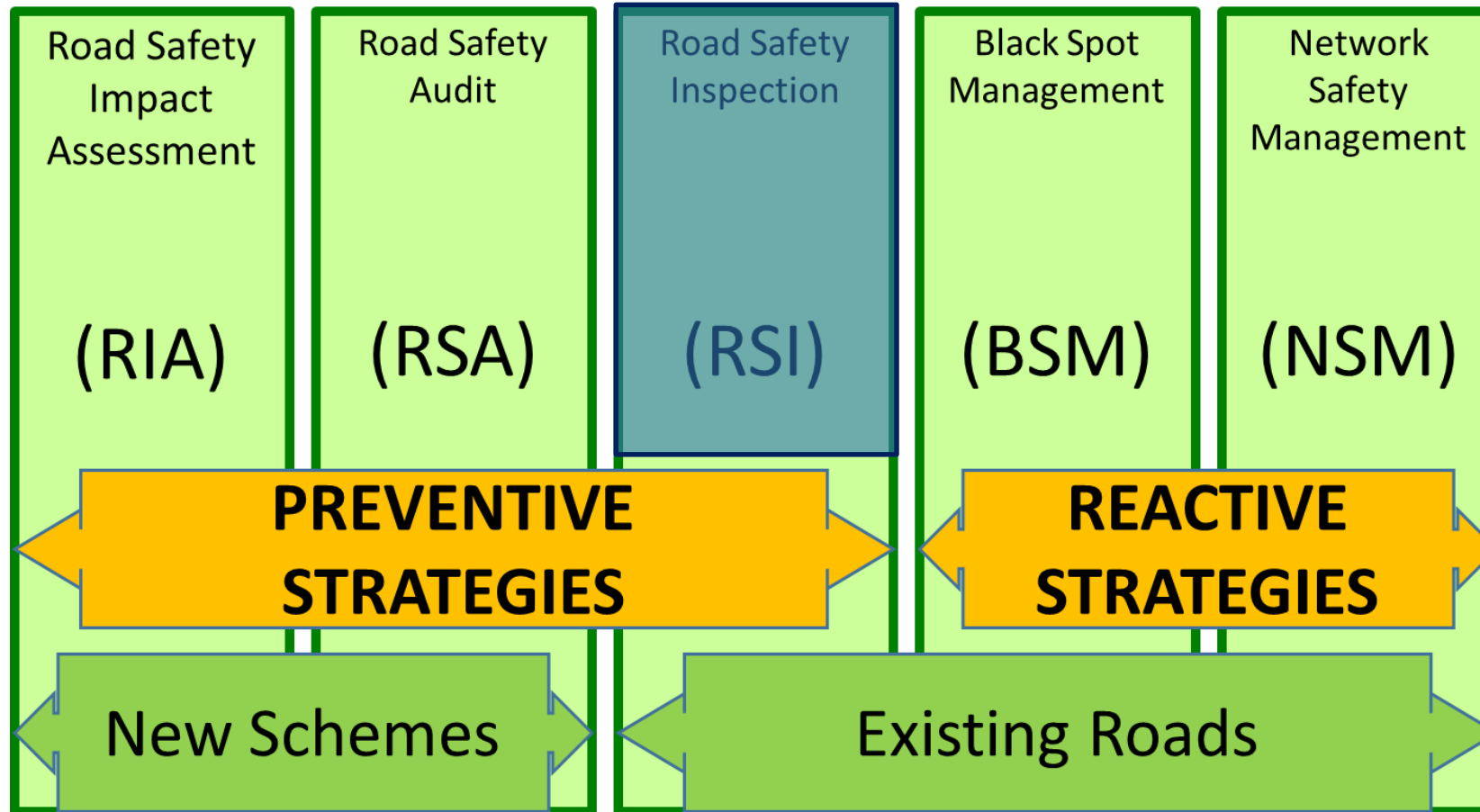


Where and when should audits be performed?

- Both on urban and rural roads
- On road projects at successive stages :
 - Planning
 - Design
 - Implementation
 - Operations
- The earlier safety audit is started, the easier it will be to influence or bring safety improvements to the project



Approaches - Road Safety Inspection



Road Safety Inspection

- Systematic assessment of an **existing road** with respect to safety features
- Identifies hazards & **suggests remedial measures**



Star Rating and Investment Plan Process



Road Survey

Georeference video data of the road collected



Road coding

Infrastructure attributes that influence road user risk recorded



Evaluation

Post-construction assessments for all road users



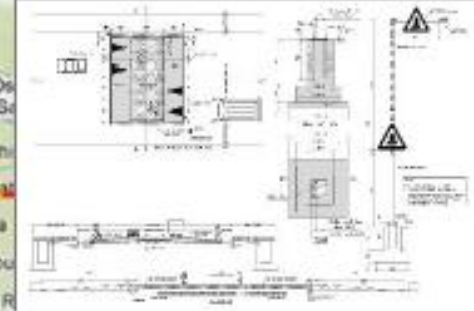
Star Ratings

For vehicle occupants, pedestrians, bicyclists and motorcyclists



Life-Saving Countermeasures

Recommendations for economic improvements



Implementation

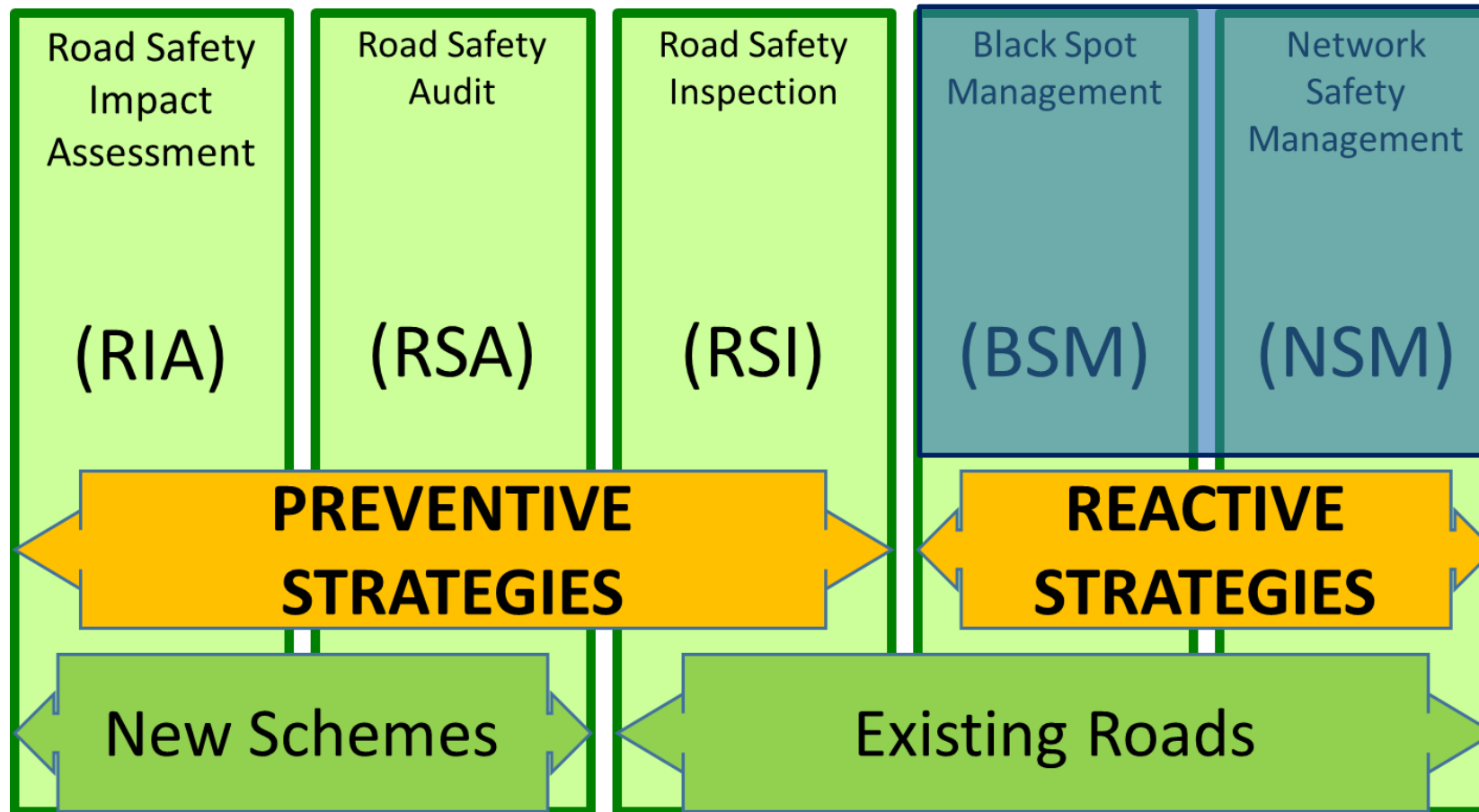
Recommendations built into road designs and projects



Training

For local engineers in risk assessment and countermeasures

Reactive Approaches

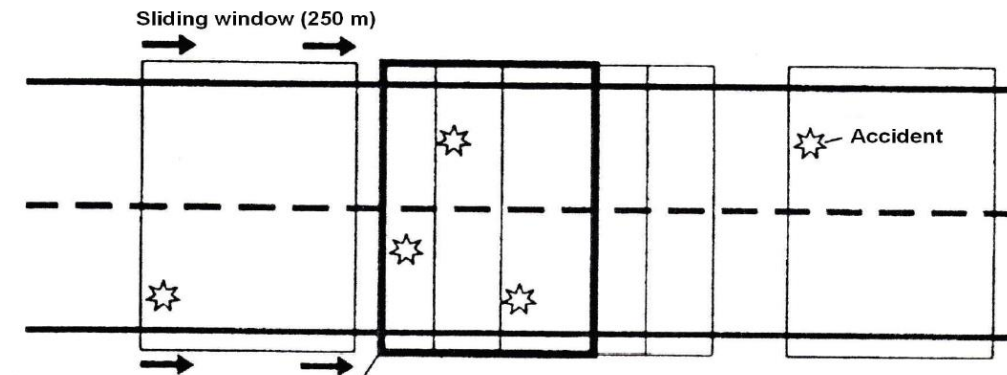


Black Spot Management - Identification

Example

“ A Black spot is any location with a maximum length of 100 m, at least 4 injury crashes have been recorded in 4 years”

- No reference to the traffic volume
- Normal number of accidents observed
- Type of location except length
- Method uses “sliding window” approach



Black Spot Map

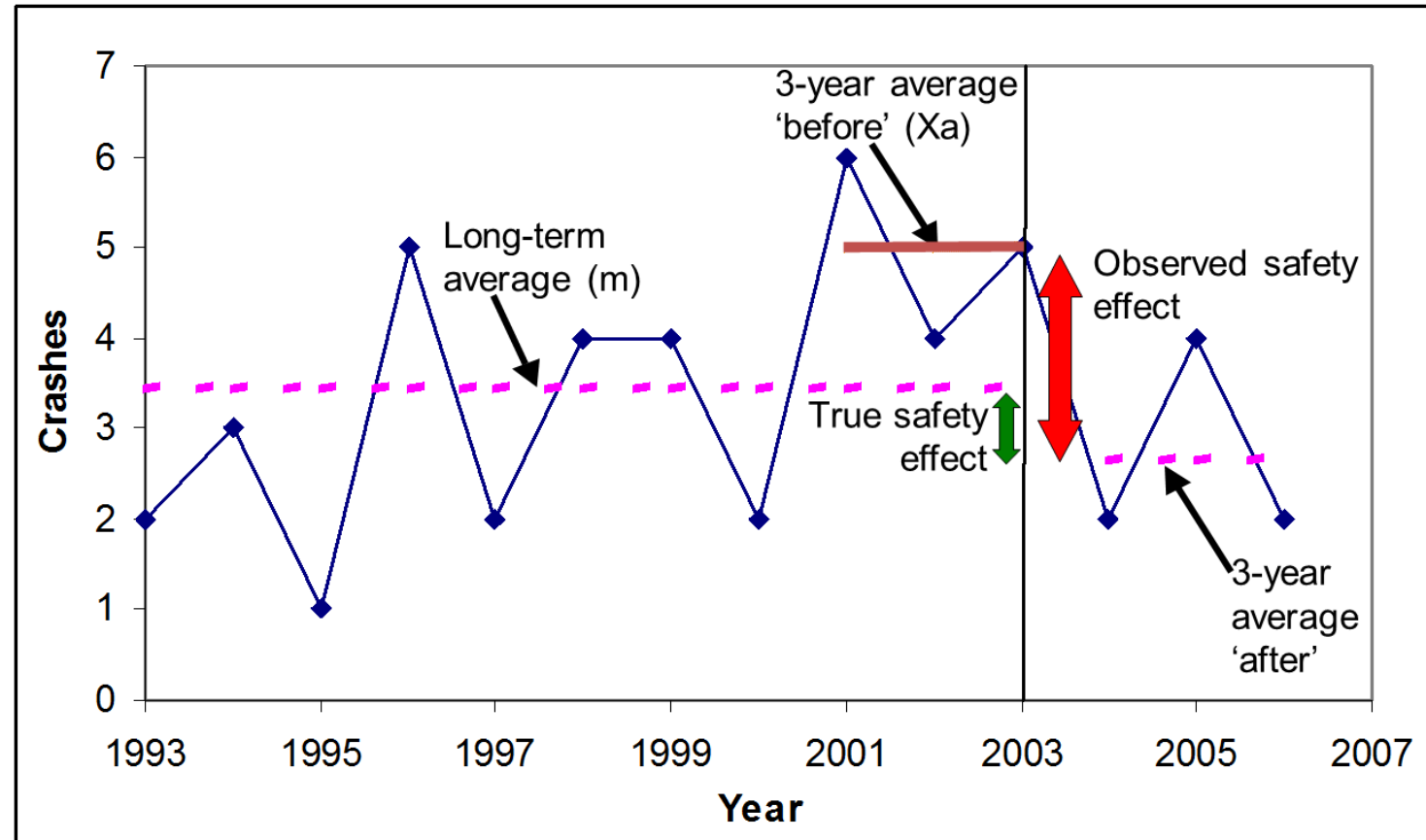


Evaluating effectiveness - “True Safety Impact”

Proper baseline
risk long-term

Observed vs
expected crashes

True long-term
effect is different
from observed
short-term one



Network Safety Management

A modern replacement to traditional BSM

Identification and treatment of hazardous road sections: any section 5-30 km that has a higher number of crashes than similar road sections

Requires traffic data

Table 3a. Risk band thresholds (3 year standard)

Risk Band	F rates/vehicle km	F rates/km
Low	0 to <2.4	0 to <0.16
Low-medium	2.4 to <9.7	0.16 to <0.32
Medium	9.7 to <16.7	0.32 to <0.48
Medium-high	16.7 to <28.4	0.48 to <0.64
High	>28.4	>0.64
	Individual Risk	Collective Risk



Comparison – Preventive vs. Reactive

Strategy	Advantages	Disadvantages
Preventive	<ul style="list-style-type: none">• Before the crash• Lives are saved	<ul style="list-style-type: none">• Hard to justify funding: no perceived problem
Reactive	<ul style="list-style-type: none">• The problem is documented	<ul style="list-style-type: none">• Requires crash data• Too late for the dead/injured

World Bank – road safety among global priorities

- Modified safeguards framework including also new road safety safeguard, i.e. minimum road safety requirements.
- Road safety to be tackled when preparing and implementing any WB supported road sector loan project.

It is expected that each World Bank road sector loan should:

- 1. include at least one road safety component;*
- 2. include at least one road safety indicator in the loan results framework;*
- 3. Make sure that urban projects with road component(s) are at least road safety informed*

- To support WB Staff and Partners a number of guidelines, tools and training materials are being prepared by GRSF

Road infrastructure - aspirations vs. reality

Forgiving Road



Road Side Hazard



Typical safety measures - rumble strips to warn drivers



Typical safety measures - gates (in UK)



Typical safety measures - centre island



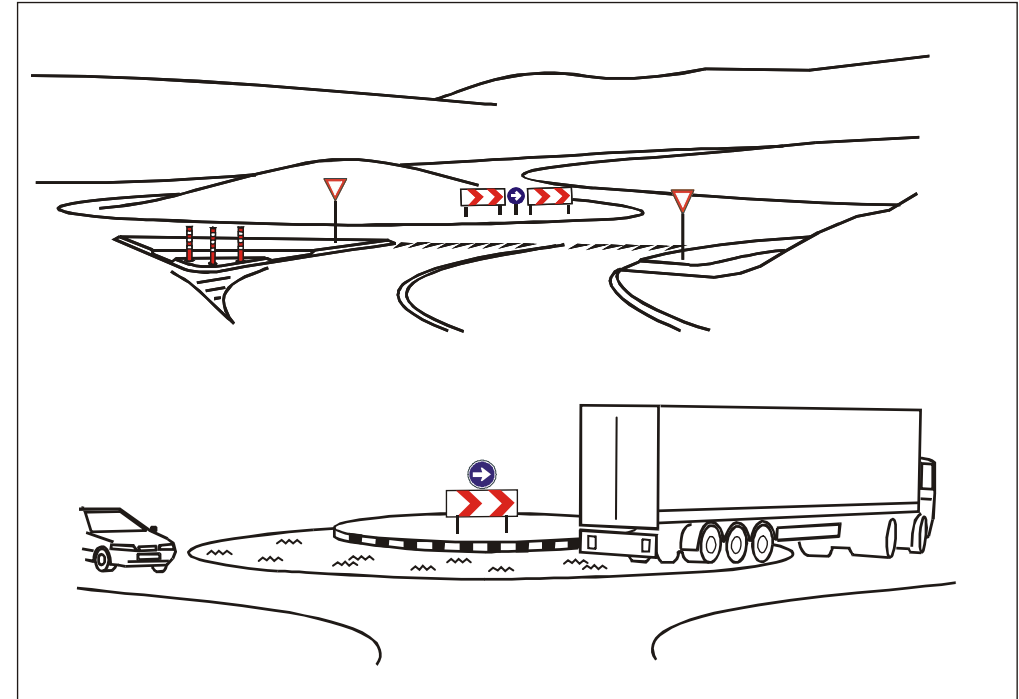
Typical safety measures - chicane



Typical safety measures - Roundabouts



Source: ©Nearmap (2015), 'ACT', map data, Nearmap, Sydney, NSW.



Typical safety measures - Road humps

Highly effective and fairly safe,
PROVIDED well-designed and well-
marked.

50km/h hump: villages on main roads
where speeding is a problem

30km/h hump: housing areas, and
outside schools, hospitals





WORLD BANK GROUP
Transport



*Together
We can Save*

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