World Bank GRSF and Asian Development Bank (ADB), in partnership with APRSO, iRAP and GRSP

Helping save lives from road crashes in Asia-Pacific

5-part webinar series - 8, 10, 15, 17, 24 February 2022

This webinar series was developed in partnership between:

ASIA-PACIFIC ROAD SAFETY OBSERVATORY

ADB

THE WORLD BANK
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GRSF
Global Road Safety Facility

Bloomberg Philanthropies
INITIATIVE FOR GLOBAL ROAD SAFETY

iRAP

GLOBAL ROAD SAFETY PARTNERSHIP

MODERATOR

Blaise Murphet

Global Road Safety Partnership (GRSP)

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COURSE EXPECTATIONS

- Certificate of Attendance will be issued to the participants who have completed all sessions.

- Homework assignment is optional, but highly recommended

PRESENTERS

Tiejun Zhang
RIOH

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MIROS

Mirick Paala
Road safety consultant
World Bank

Luke Rogers
Global Operations Manager
iRAP

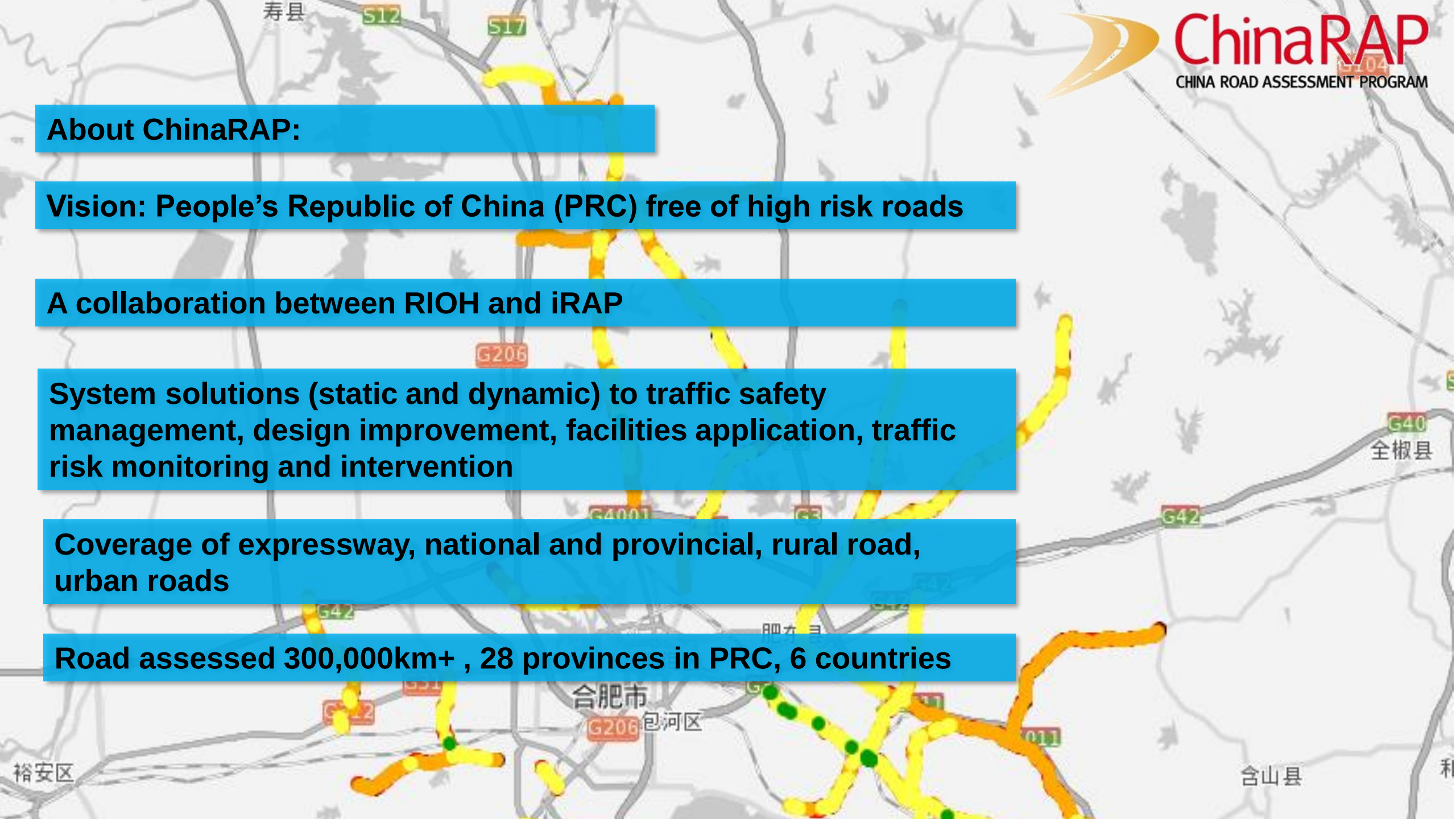
Kasem Choocharukul
Professor
Chulalongkorn University

Overview of the webinar session

Topic	Speaker
Open	Blaise Murphet, GRSP
Star Rating existing roads, designs and upgraded roads in People's Republic of China	Tiejun Zhang, Research Institute of Highway RIOH, ChinaRAP
MyRAP and motorcycle safety in Asia	Alvin Poi, Malaysian Institute of Road Safety Research, MIROS
Questions from the audience	Blaise Murphet, GRSP
Using crash data and Star Ratings: DRIVER and iRAP integration	Mirick Paala, World Bank
Star Rating for Designs (SR4D) in Fiji and Samoa	Luke Rogers, iRAP
Establishing ThaiRAP and light Star Ratings	Kasem Choocharukul, Chulalongkorn University
Questions from the audience	Blaise Murphet, GRSP
Summary and close	Blaise Murphet, GRSP

Star Rating existing roads, designs and upgraded roads in People's Republic of China

Tiejun Zhang
RIOH



ChinaRAP
CHINA ROAD ASSESSMENT PROGRAM

About ChinaRAP:

Vision: People's Republic of China (PRC) free of high risk roads

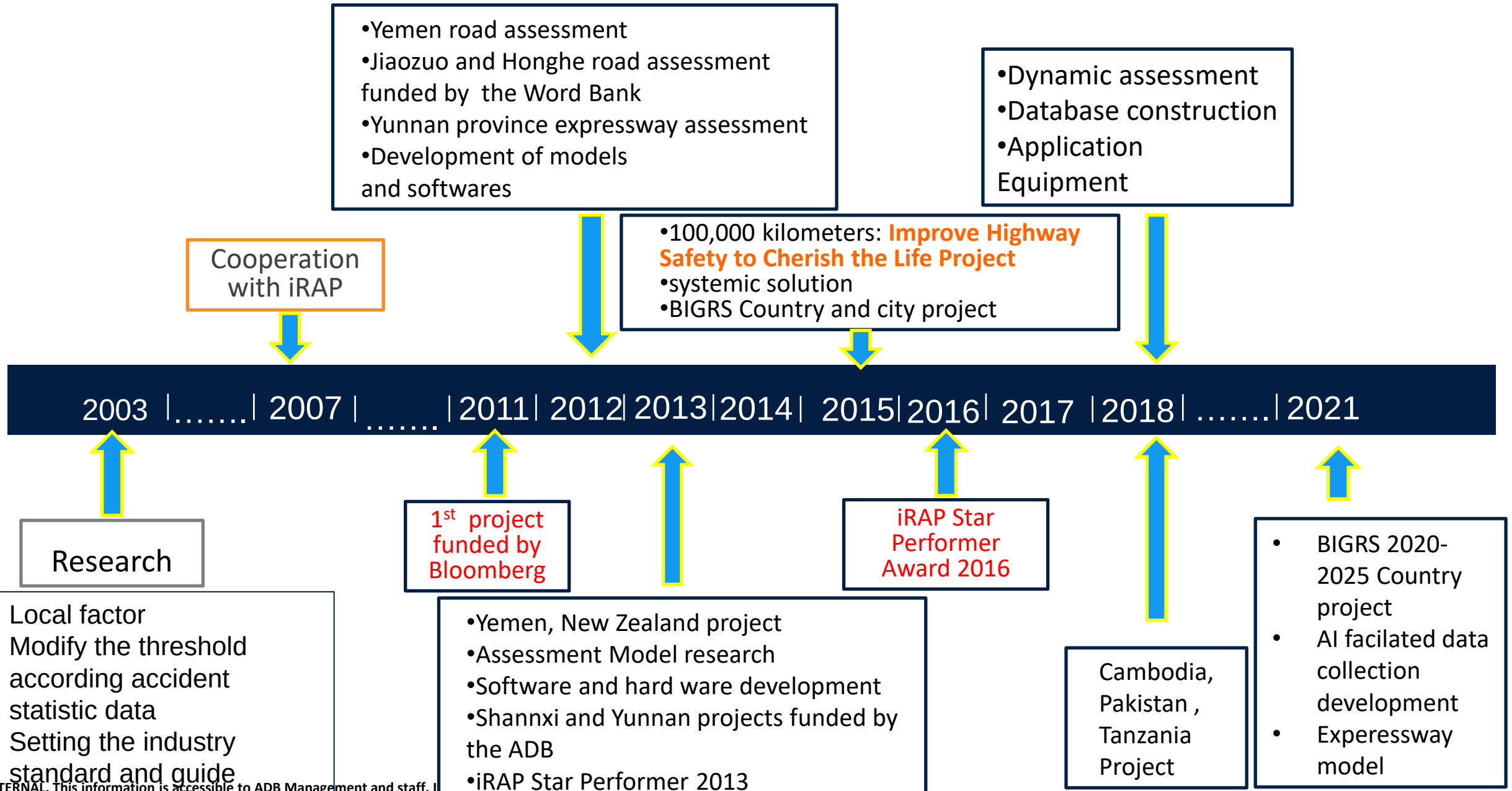
A collaboration between RIOH and iRAP

System solutions (static and dynamic) to traffic safety management, design improvement, facilities application, traffic risk monitoring and intervention

Coverage of expressway, national and provincial, rural road, urban roads

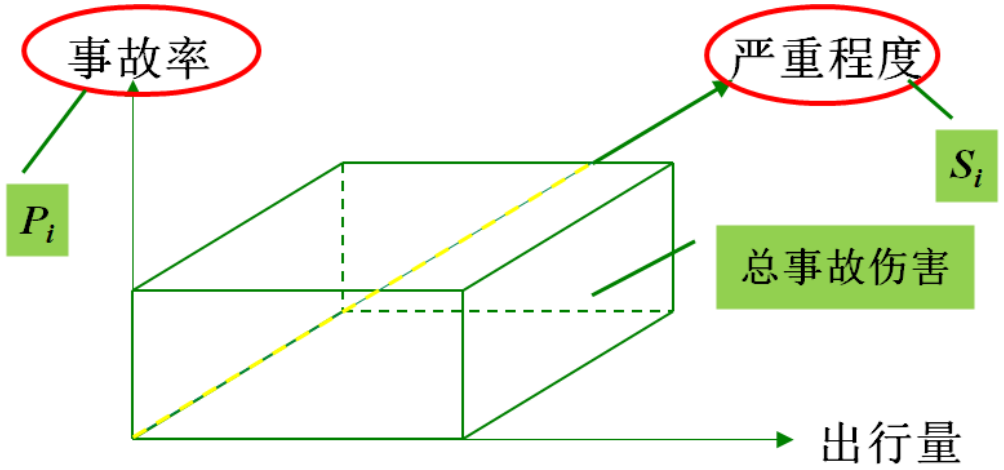
Road assessed 300,000km+ , 28 provinces in PRC, 6 countries

ChinaRAP Development



ChinaRAP R&D

Establish systematic road risk techniques(models for expressways and other roads)



$$RPS = RPS_1 + RPS_2 + RPS_3$$
$$= P_1 \times S_1 + P_2 \times S_2 + P_3 \times S_3$$
$$= \prod_{i=1}^{a} P_i^1 \times \prod_{j=1}^{b} S_j^1 + \prod_{i=1}^{c} P_i^2 \times \prod_{j=1}^{d} S_j^2 + \prod_{i=1}^{e} P_i^3 \times \prod_{j=1}^{f} S_j^3$$

$$HRI=\sum_{i=1}^{i_0} HRI_i$$

$$HRI_i=P_i \times S_i \times C_i$$

$$P_i=\prod_{j=1}^{j_0} P_{ij}$$

$$S_i=\prod_{k=1}^{k_0} S_{ik}$$

$$C_i=V_i \times Q_i$$

其中，HRI——公路设施和交通条件风险指数；

HRI_i——第 i 类事故类型公路设施和交通条件风险指数；

i_0——事故类型总数；

P_i——第 i 类事故类型风险可能性；

P_{ij}——第 i 类事故类型风险可能性对应的第 j 个评估指标风险系数；

j_0——第 i 类事故类型风险可能性对应的评估指标总数；

S_i——第 i 类事故类型风险严重性；

S_{ik}——第 i 类事故类型风险严重性对应的第 k 个评估指标风险系数；

k_0——第 i 类事故类型风险严重性对应的评估指标总数；

C_i——第 i 类事故类型风险修正系数；

V_i——第 i 类事故类型风险运行速度系数；

Q_i——第 i 类事故类型风险交通量系数。

Risk: Combination of crash probability and severity.

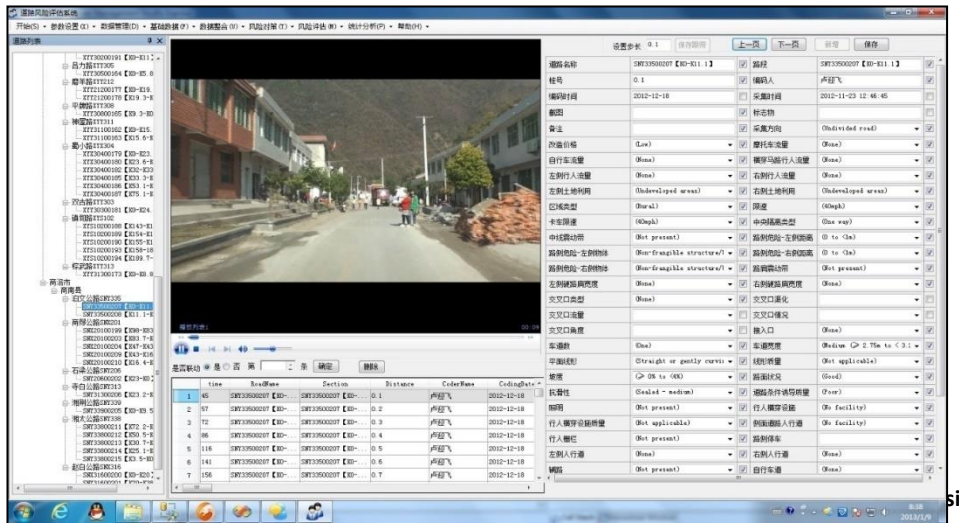
$$f(R) = f(P, C) = f(P) \ \& \ f(C)$$

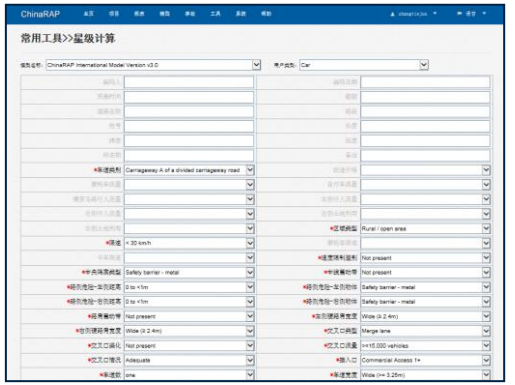
ChinaRAP R&D

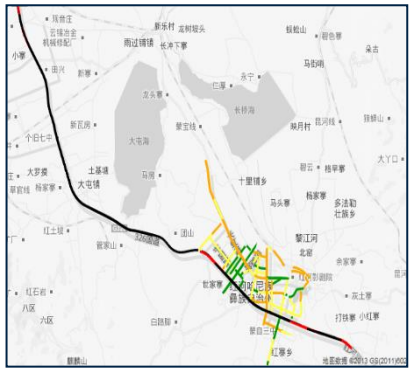
Develop and upgrade application systems(Survey Equipments & Software)

- Collecting data on the operating roads in average speed.
- Intelligent recognition Safety Barrier/Pole/Road Marking
- Measure the Height of Barrier and the Radius of Pole

Coding and Road Asset Management System







Road Risk Assessment System like Vida

side ADB with appropriate permission.

ChinaRAP Application Scenarios

National Mass-Action Projects（Traffic safety policy making and pilot projects）

- Highway Safety to Cherish Life Project (Project goal: to eliminate high risk road sections (level 4 and 5)
- National Trunk Roads Quality Supervision Project

Provincial Projects

- Regional speed management projects
- Provincial level black-spot screening and treatments
- Dynamic risk assessment

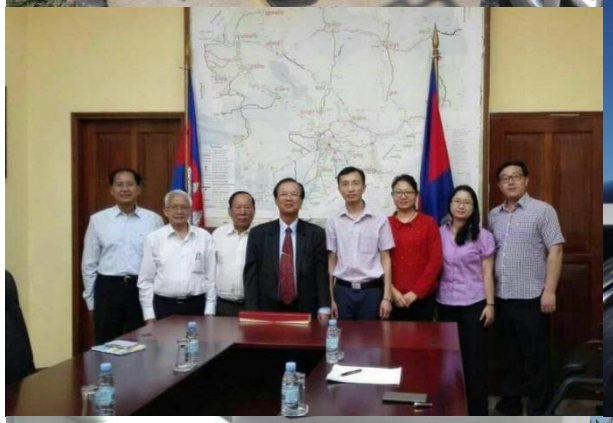
MDB-supported Projects in PRC

- GRSF BIGRS (country and city)
- ADB Shaanxi Mountain Road Safety Demonstration Project
- WB Tongren Rural Roads Project

Overseas Projects

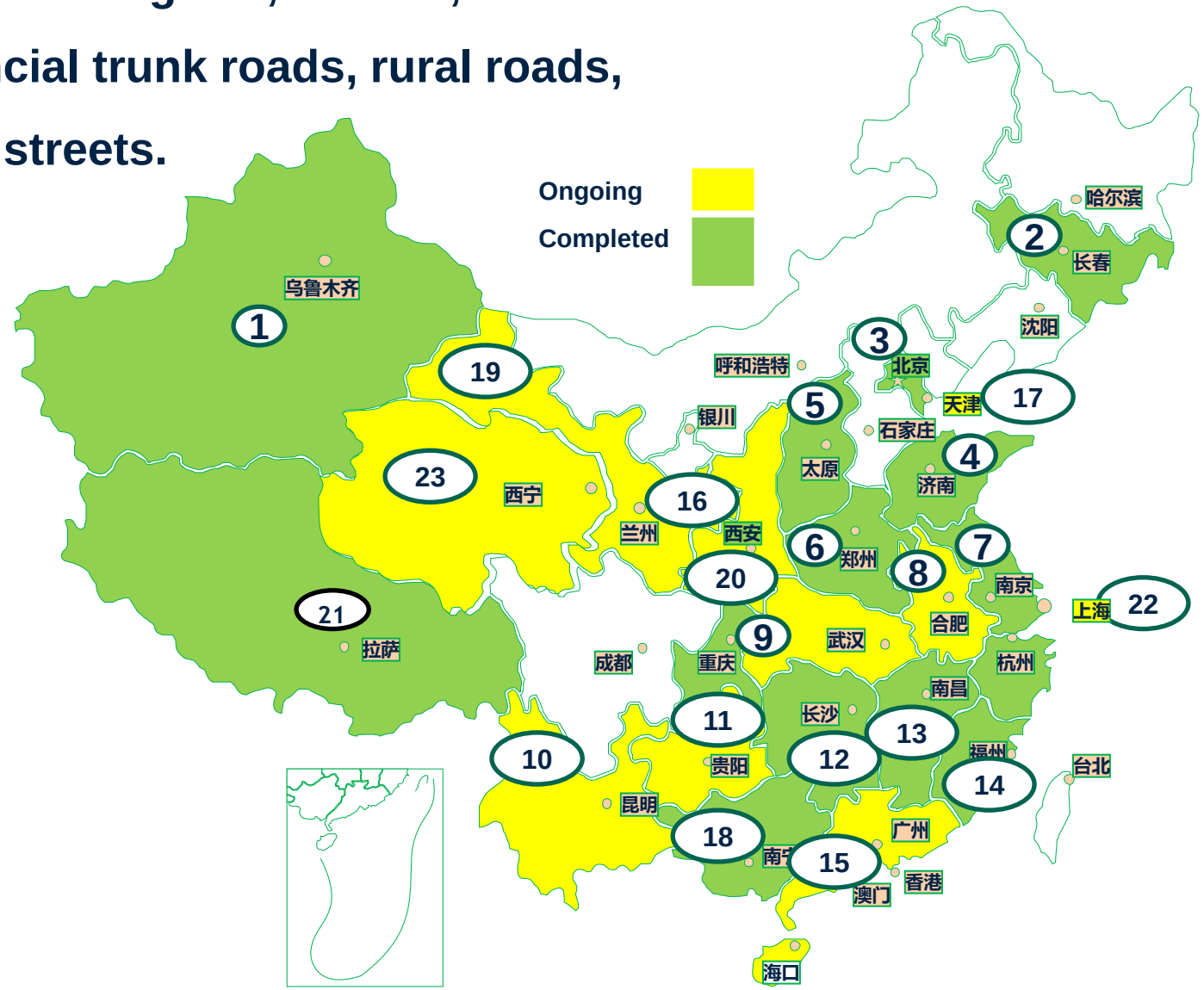
- ADB Unlocking Innovation for Development project – Pakistan
- Cambodia – China Road Safety Friendship Project
- WB –Yemen Transport Project
- BIGRS – Tanzania Road Assessment Project

Overseas projects Yemen, New Zealand, Australia, Cambodia, Pakistan, Tanzania, ……



Road Assessment

Assessed roads on more than 24 provinces, totaling 300,000+km, national and provincial trunk roads, rural roads, and urban streets.



Case Study 1: National Highway Safety to Cherish the Life Project

Project highlights:

Baseline assessment, interactive design and post construction assessment

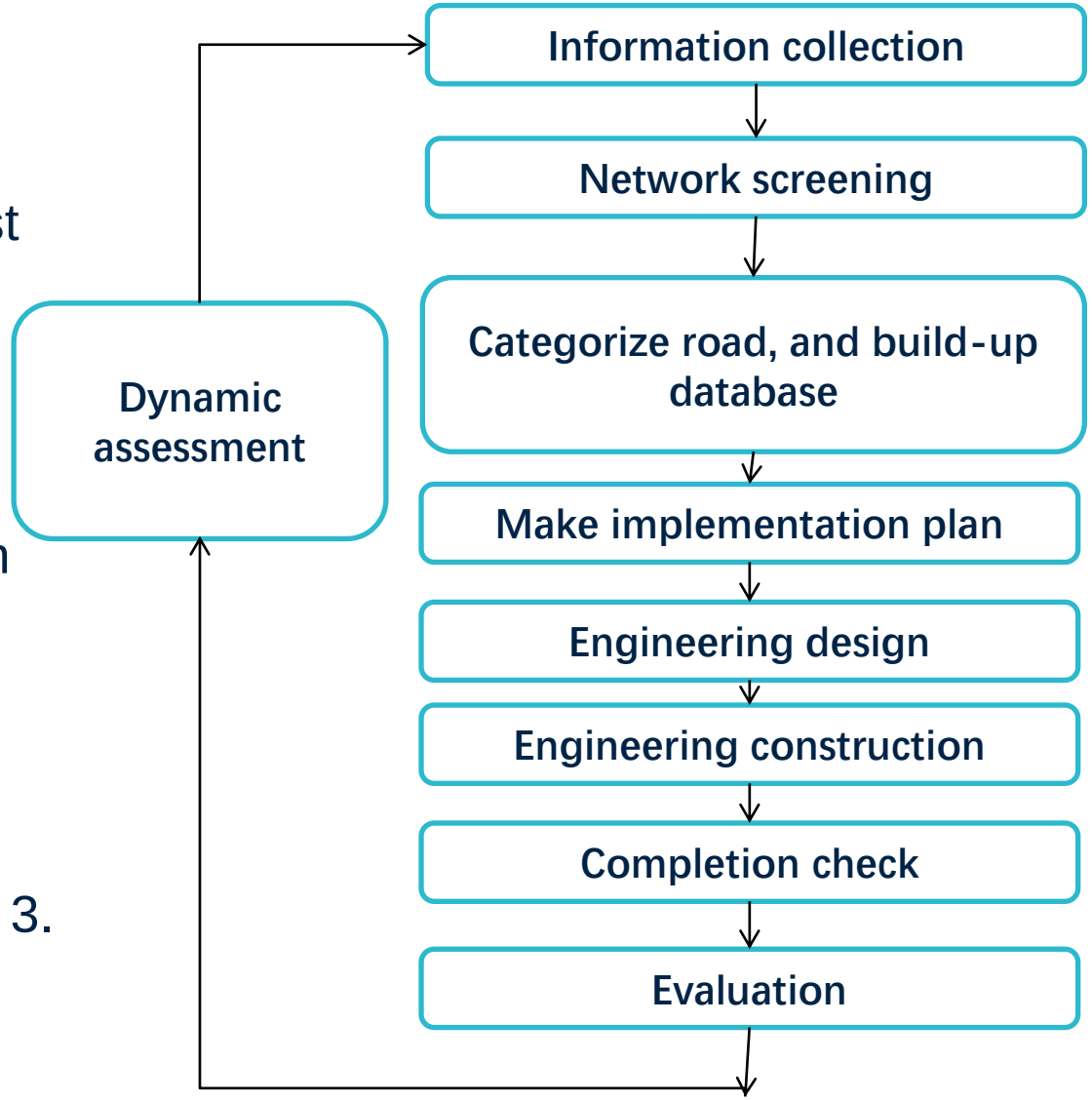
Project contents:

After risk - wise engineering measures being implemented, post construction elevation are conducted using the same magnitude, evaluation model to achieve the performance tracking.

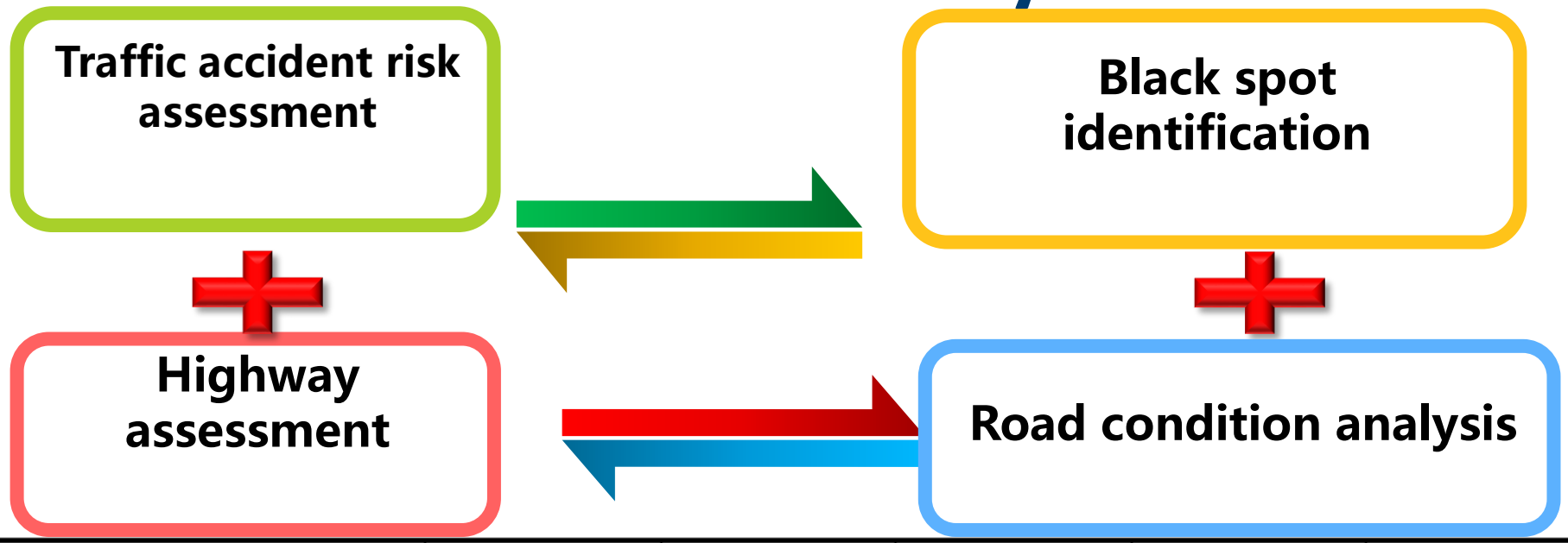
Project outcomes:

As for Guizhou and Zhejiang pilot project(example):

- The average level of a city or a county is Level 3.



High Risk location identifications by risk score



交通事故风险 / 公路风险	I	II	III	IV	V
I	D	D	D	C	C
II	D	D	D	C	C
III	D	D	D	C	C
IV	B	B	B	A	A
V	B	B	B	A	A

Road and traffic condition, countermeasures analysis

Location: K2264+100

Classification: A

Intersection, bad sight distance

- Add warning or directory signs for intersections.
- Add crosswalks.
- Add stop signs.
- Remove obstacles to improve sight distance.

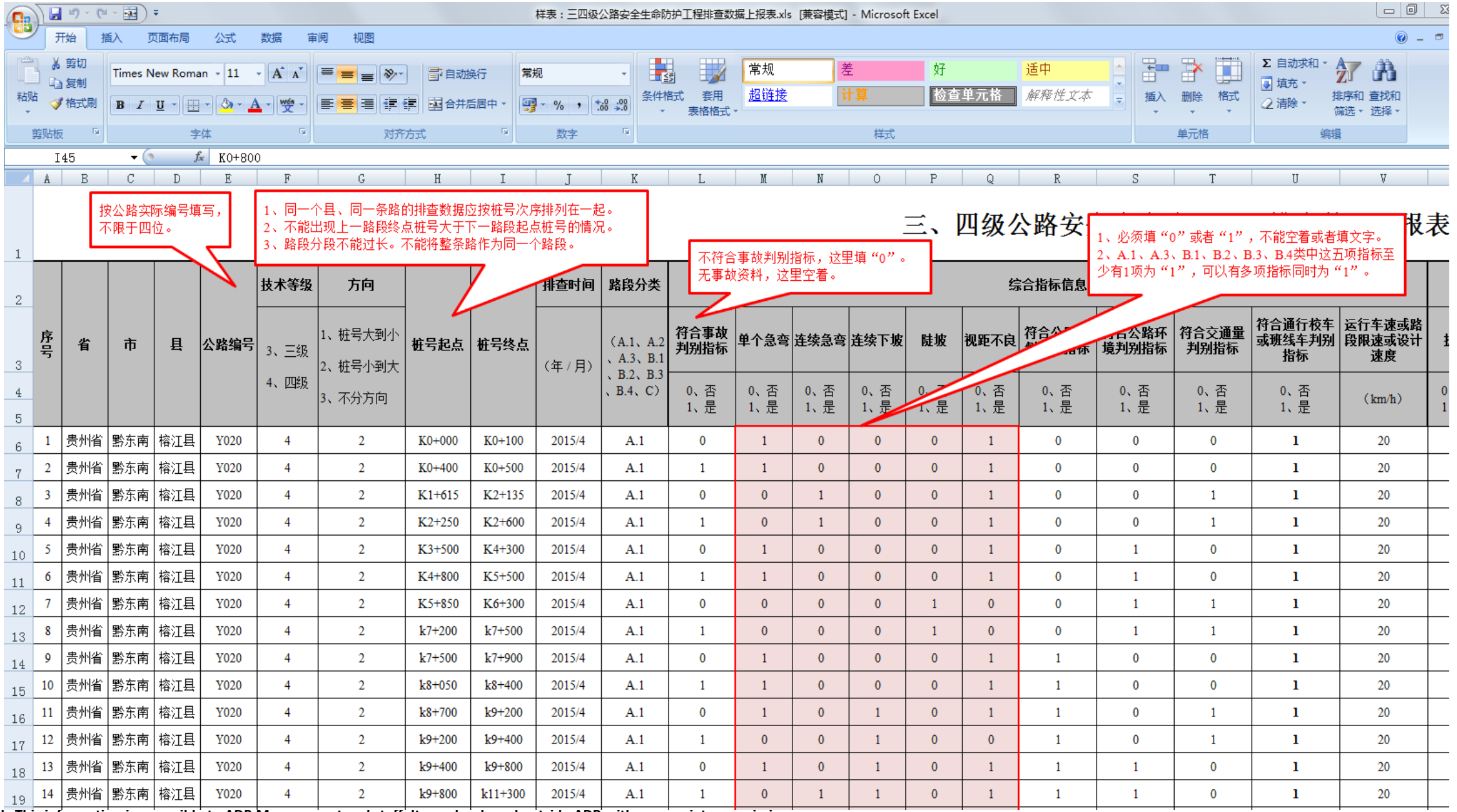
Poor delineation

- Add centerline.

Village, high density of access points

- Post speed limits.
- Add intersection posts to small access points.

Improvement plan making

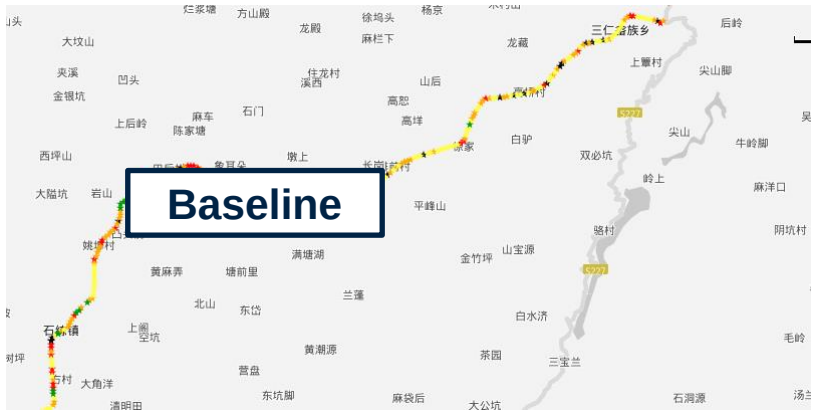


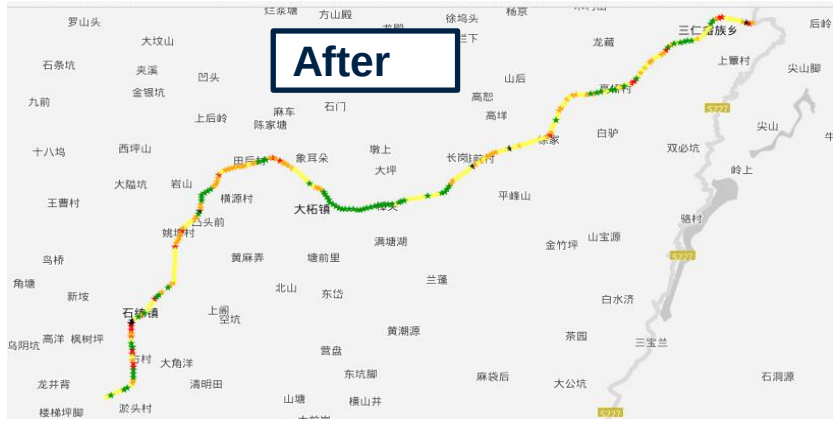
序号	省	市	县	公路编号	技术等级 3、三级 4、四级	方向 1、桩号大到小 2、桩号小到大 3、不分方向	桩号起点	桩号终点	排查时间 （年/月）	路段分类 （A.1、A.2、A.3、B.1、B.2、B.3、B.4、C）	综合指标信息											
											符合事故判别指标 0、否 1、是	单个急弯 0、否 1、是	连续急弯 0、否 1、是	连续下坡 0、否 1、是	陡坡 0、否 1、是	视距不良 0、否 1、是	符合公[illegible] 0、否 1、是	[illegible]公路环境判别指标 0、否 1、是	符合交通量判别指标 0、否 1、是	符合通行校车或班线车判别指标 0、否 1、是	运行车速或路段限速或设计速度 （km/h）	0 1
1	贵州省	黔东南	榕江县	Y020	4	2	K0+000	K0+100	2015/4	A.1	0	1	0	0	0	1	0	0	0	1	20	
2	贵州省	黔东南	榕江县	Y020	4	2	K0+400	K0+500	2015/4	A.1	1	1	0	0	0	1	0	0	0	1	20	
3	贵州省	黔东南	榕江县	Y020	4	2	K1+615	K2+135	2015/4	A.1	0	0	1	0	0	1	0	0	1	1	20	
4	贵州省	黔东南	榕江县	Y020	4	2	K2+250	K2+600	2015/4	A.1	1	0	1	0	0	1	0	0	1	1	20	
5	贵州省	黔东南	榕江县	Y020	4	2	K3+500	K4+300	2015/4	A.1	0	1	0	0	0	1	0	1	0	1	20	
6	贵州省	黔东南	榕江县	Y020	4	2	K4+800	K5+500	2015/4	A.1	1	1	0	0	0	1	0	1	0	1	20	
7	贵州省	黔东南	榕江县	Y020	4	2	K5+850	K6+300	2015/4	A.1	0	0	0	0	1	0	0	1	1	1	20	
8	贵州省	黔东南	榕江县	Y020	4	2	k7+200	k7+500	2015/4	A.1	1	0	0	0	1	0	0	1	1	1	20	
9	贵州省	黔东南	榕江县	Y020	4	2	k7+500	k7+900	2015/4	A.1	0	1	0	0	0	1	1	0	0	1	20	
10	贵州省	黔东南	榕江县	Y020	4	2	k8+050	k8+400	2015/4	A.1	1	1	0	0	0	1	1	0	0	1	20	
11	贵州省	黔东南	榕江县	Y020	4	2	k8+700	k9+200	2015/4	A.1	0	1	0	1	0	1	1	0	1	1	20	
12	贵州省	黔东南	榕江县	Y020	4	2	k9+200	k9+400	2015/4	A.1	1	0	0	1	0	0	1	0	1	1	20	
13	贵州省	黔东南	榕江县	Y020	4	2	k9+400	k9+800	2015/4	A.1	0	1	0	1	0	1	1	1	0	1	20	
14	贵州省	黔东南	榕江县	Y020	4	2	k9+800	k11+300	2015/4	A.1	1	0	1	1	0	1	1	1	0	1	20	

Propose practical risk mitigation countermeasures based on socio-economic factors and government budgets.

Category	Timeline	Description	Examples
A	Immediately	• Daily maintenance items	• Improved signage or markings • Fix blocked signage • Repair barriers
B	1 Year	• Add to annual maintenance list	• Hardened shoulder • Cover roadside drainage ditch • Add barriers
C	2-5 Years	• Add to 5-year plans	• Signalize intersection • Improved curvature • Add streetlights
D	5-10 Years	• Increased road capacity • Long-term funding required	• Rebuild or expansions

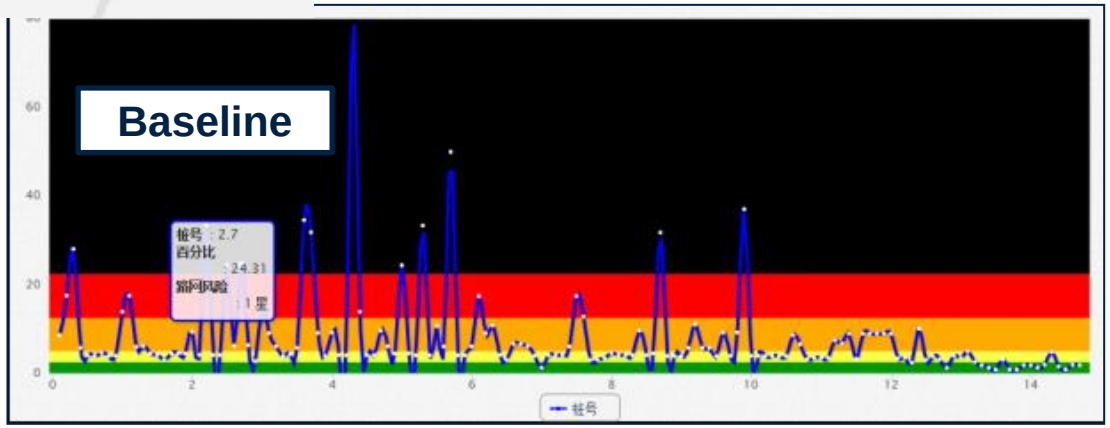
Interactive design procedure

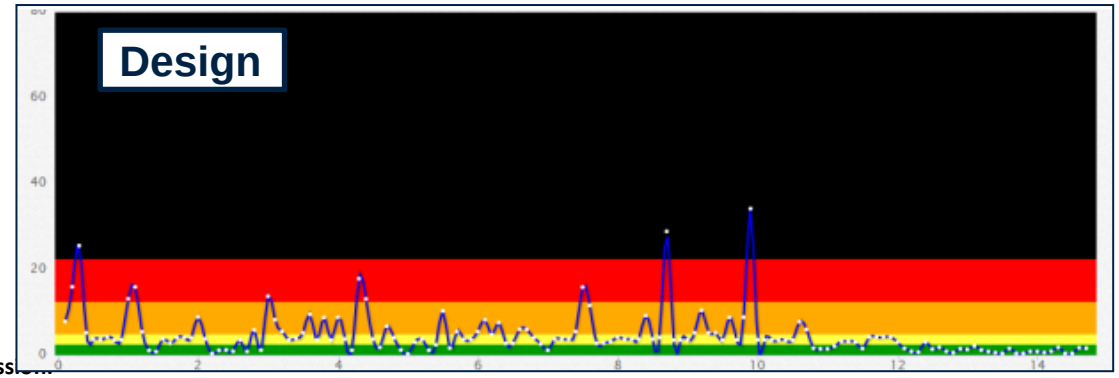




路网风险	路长（kms）	百分比（%）
5 星	2.70	10.34
4 星	10.20	39.08
3 星	8.50	32.57
2 星	2.80	10.73
1 星	1.90	7.28

路网风险	路长（kms）	百分比（%）
5 星	7.10	27.20
4 星	9.50	36.40
3 星	6.90	26.44
2 星	2.00	7.66
1 星	0.60	2.30





Baseline: high risk roadside, lack of sign, high speed, bad sight distance….

Design: barrier, delineation, traffic calming, intersection improvement.

Risk level change by safer designs- barrier

X603 k2.5
Before
Risk level：Level 5

Roadside: cliff

Distance of roadside objects to edgelines: 0-1m

Insufficient roadside protection at bridge sections

Speed limit 60km/h

Low level of barriers at bridge transitional sections

Measures adopted in design	Design Risk Level
Barrier upgrade at transitional sections at bridges	Level 3
Upgrade bridge barrier with higher protections	

Risk level change by redesign the intersections

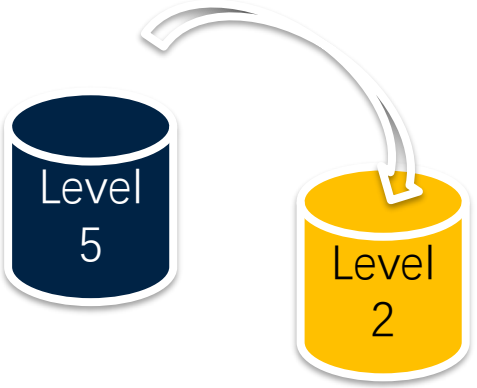
X603 K0.4Risk level:
Level 5

Intersection sight disctance (obstructed by plants, 1.5m in hight)

Insufficient intersection channelization, scattered traffic conflict points

Speed limit 60km/h

Sharp radius curves



Measures adopted in design	Design Risk Level
Left-turn lane	Level 2
Intersection channelization	
Objects obstructions clear at intersections	
Markings using high reflective materials at traffic island	

Case study 2: Tongren Rural Roads Project

Project highlights:

Engineering, vulnerable road users-oriented, road safety handbook

Project contents:

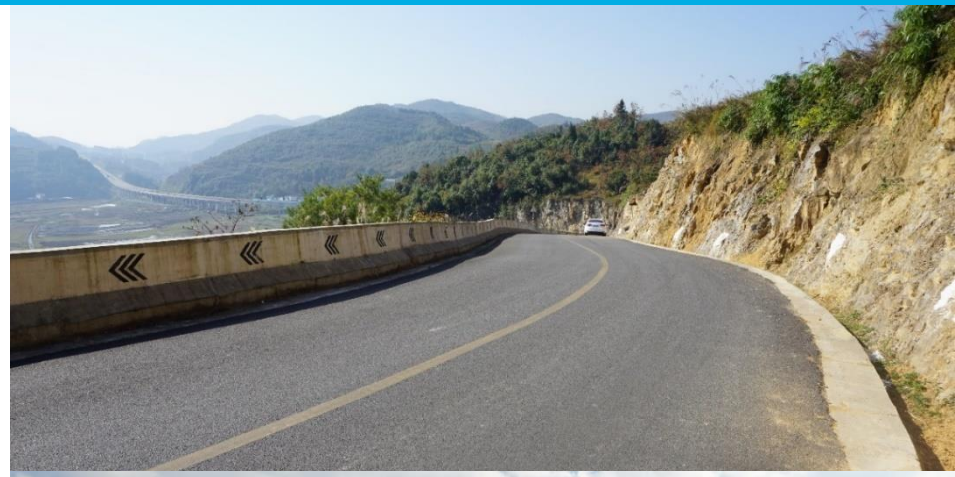
Systematic rural road improvement, including construction, management, maintenance, and operation. (Dejiang and Sinan Counties, Tongren City, Guizhou Province)

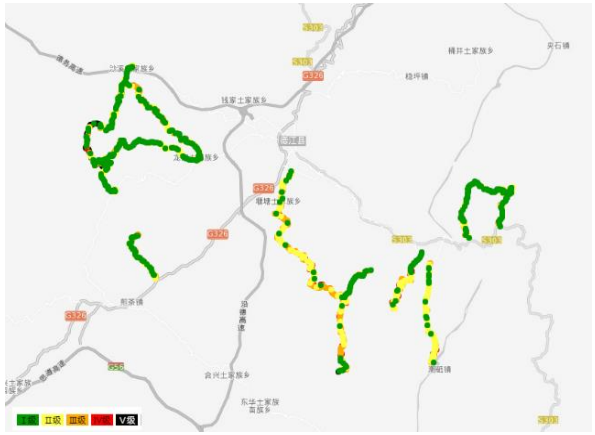
Project outcomes:

1.Drastic improvement of safety levels: from ~81% 2- or 1-star roads in 2017 to ~5% in 2019.

2.Identified areas of improvement for school zones, including management, education, and hardware improvement.

3.Handbook provides step-by-step guidance on identification, prioritization, design, and implementation of safety improvement measures.





Case study 3: Urban streets - Xining Urban Transport Project

Project highlights:

Baseline, FSR design and post construction assessments and interventions

Project contents:

4.8km of urban streets upgrades under the World Bank financial supports were assessed during baseline, FSR design, and post-construction stage. Star ratings to FSR designs were worse at several locations and some of the roads are not constructed complying with the designs. These problems were fixed during several iterations of assessments.

Project outcomes:

The 100% of roads that are rated 3-stars or better are largely improved.

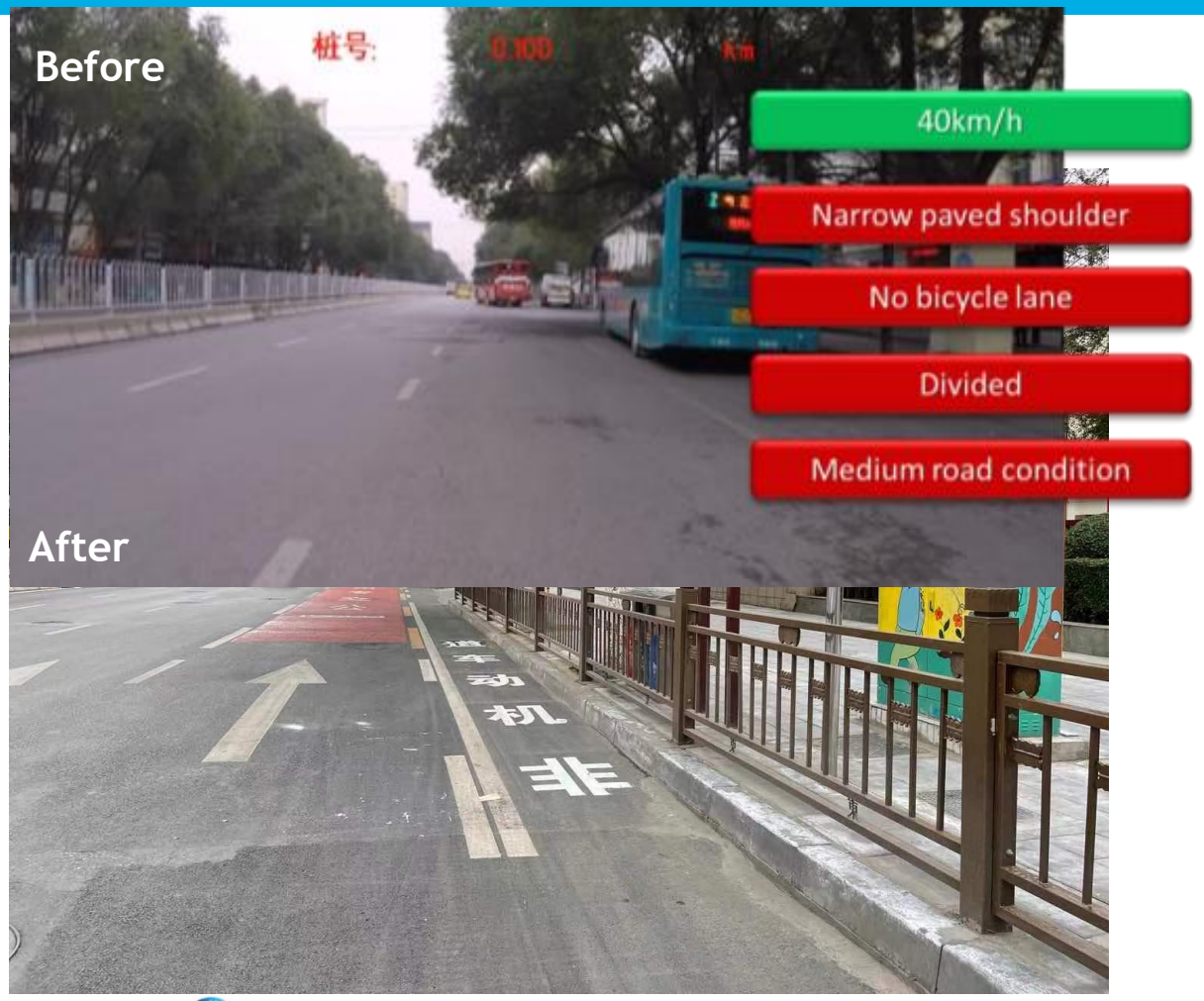
Road user	Baseline	FSR Design	Post-construction
Vehicle occupants	91%	88%	100%
Pedestrians	46%	56%	100%
Bicyclists	79%	88%	100%

Star Rating of vehicle occupants: Bayi Road

Road attribute	Existing	FSR Design	Post-Construction
Vehicle occupant star rating	3 stars	2 stars	5 stars
Speed limit	40km/h	60km/h	40km/h
Road condition	Medium	Good	Good
Intersection quality	Poor	Adequate	Adequate
Skid resistance	Medium	Good	Good
Delineation	Adequate	Adequate	Adequate
Carriageway	Divided	Divided	Divided

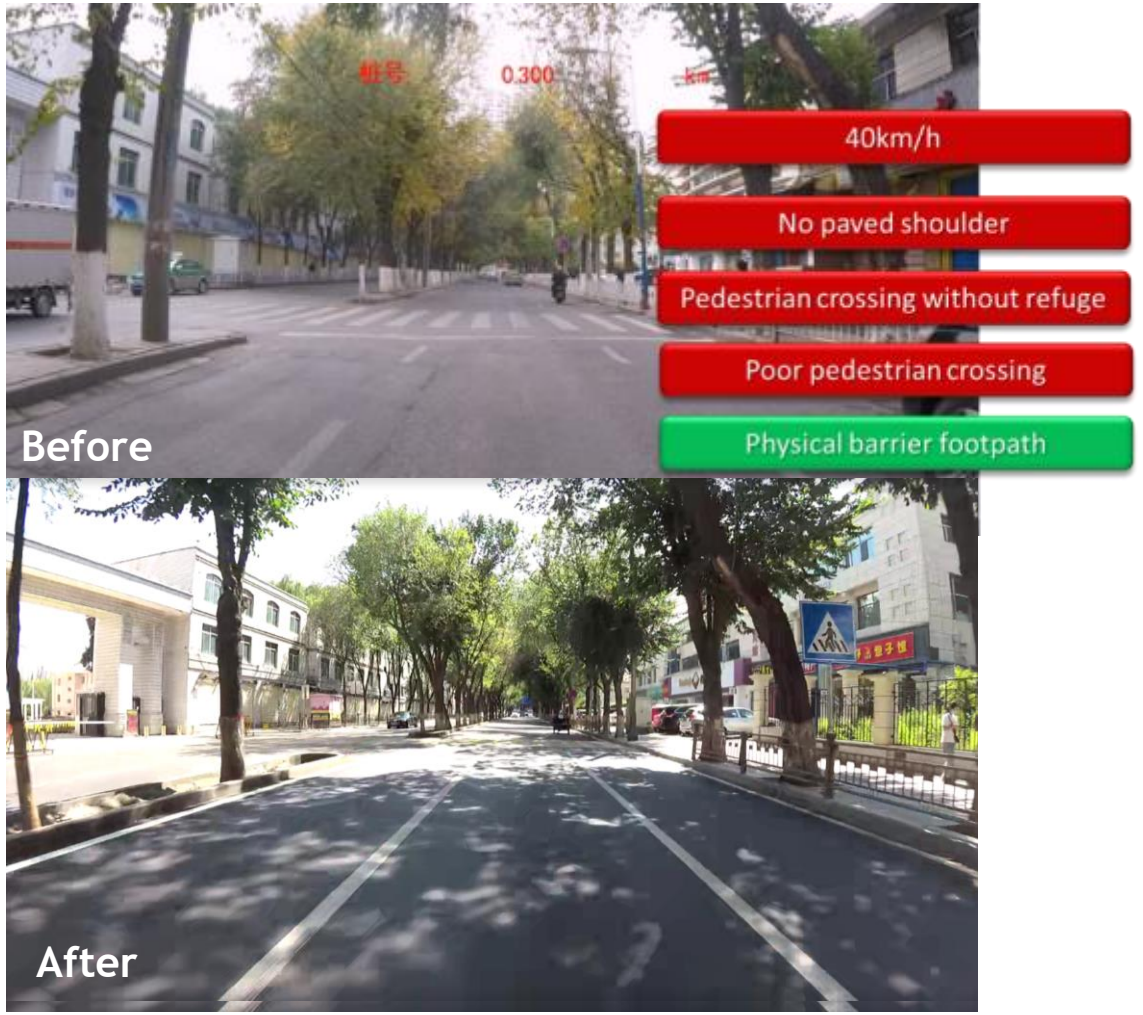
Star Rating example of bicyclists: Bayi Road

Road attribute	Existing	FSR Design	Post-construction
Bicyclist star rating	3 stars	2 stars	4 Stars
Speed limit	40km/h	60km/h	40km/h
Paved shoulder	Narrow	Narrow	Narrow
Bicycle lane	No	No	On-road bicycle lane
Carriageway	Divided	Divided	Divided
Road condition	Medium	Adequate	Adequate



Star Rating example of pedestrians: Delingha Road

Road attribute	Existing	Design	Post-construction
Pedestrian star rating	2 stars	3 stars	4 stars
Speed limit	40km/h	40km/h	40km/h
Paved shoulder	No	No	No
Pedestrian crossing	Without safety refuge	With safety refuge	With safety refuge
Pedestrian crossing quality	Poor	Adequate	Adequate
Footpath	With physical barrier	With physical barrier	With physical barrier



In conclusion

Road risk and *Star Rating assessment for existing roads, designs and upgraded roads proved to have:*

- *Risk model need to be continuously improved to match dynamic road and traffic conditions*
- *Low cost data survey and coding methods are important*
- *Encourage the country to adopt the idea of risk magenagement;*
- *Enabled MDB projects to track their project road safety and ecomonic indicators;*
- *Knowledge-transfer to other countries and regions with similar road safety issues.*

Questions?

MyRAP and motorcycle safety in Asia

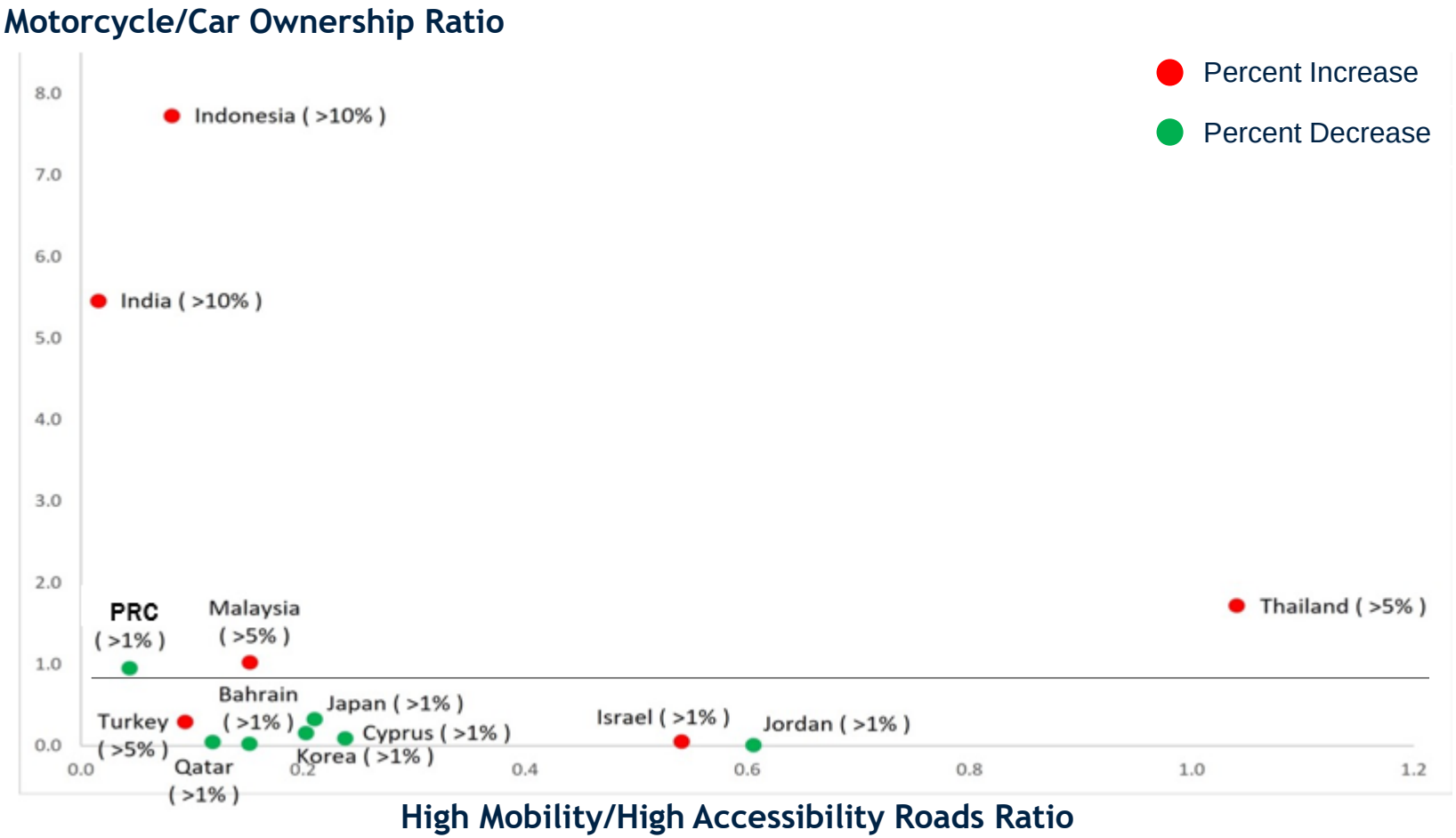
Alvin Poi
Research Officer
MIROS

MyRAP and Motorcycle Safety in Asia

Alvin Poi Wai Hoong
Research Officer
Malaysian Institute of Road Safety Research

Source: ITIS DBKL

Percent change in motorcycle deaths 2006-2016 in selected Asian countries



Effort to reduce motorcycle fatalities should target the aspects of road supply and demand for motorcycle as they are interdependent!

Source:
1. Global Status Report on Road Safety 2009 & 2018, WHO
2. World Road Statistics Annual Yearbook, IRF

Dilemma faced by developing countries

- More high mobility roads for economy growth, more safety problems for motorcyclists.
- Banning motorcycles on highways, less route options for motorcyclists.
- More safer highways for motorcyclists, more money to be spent.

Huge challenge in rural areas

Risk factors:

- High speed
- Undivided road
- Roadside hazards
- No motorcycle facility

Source:
Scary Motorcycle Crash Compilation Ep.1 (Indonesia Special), GalleryMoto17 YouTube channel, 31 Oct 2017.

Huge challenge in rural areas

Risk factors:

- High speed
- Poor delineation
- Poor surface condition
- No motorcycle facility

Source:
Highway superbike accident 2019 | bike accident in India, K9IGHT RIDER INDIA YouTube channel, 16 Apr 2019.

Huge challenge in rural areas

Risk factors:

- High speed
- Poor road geometrics
- Poor surface condition
- Roadside hazards

Source:
CTN News, 2 March 2019.

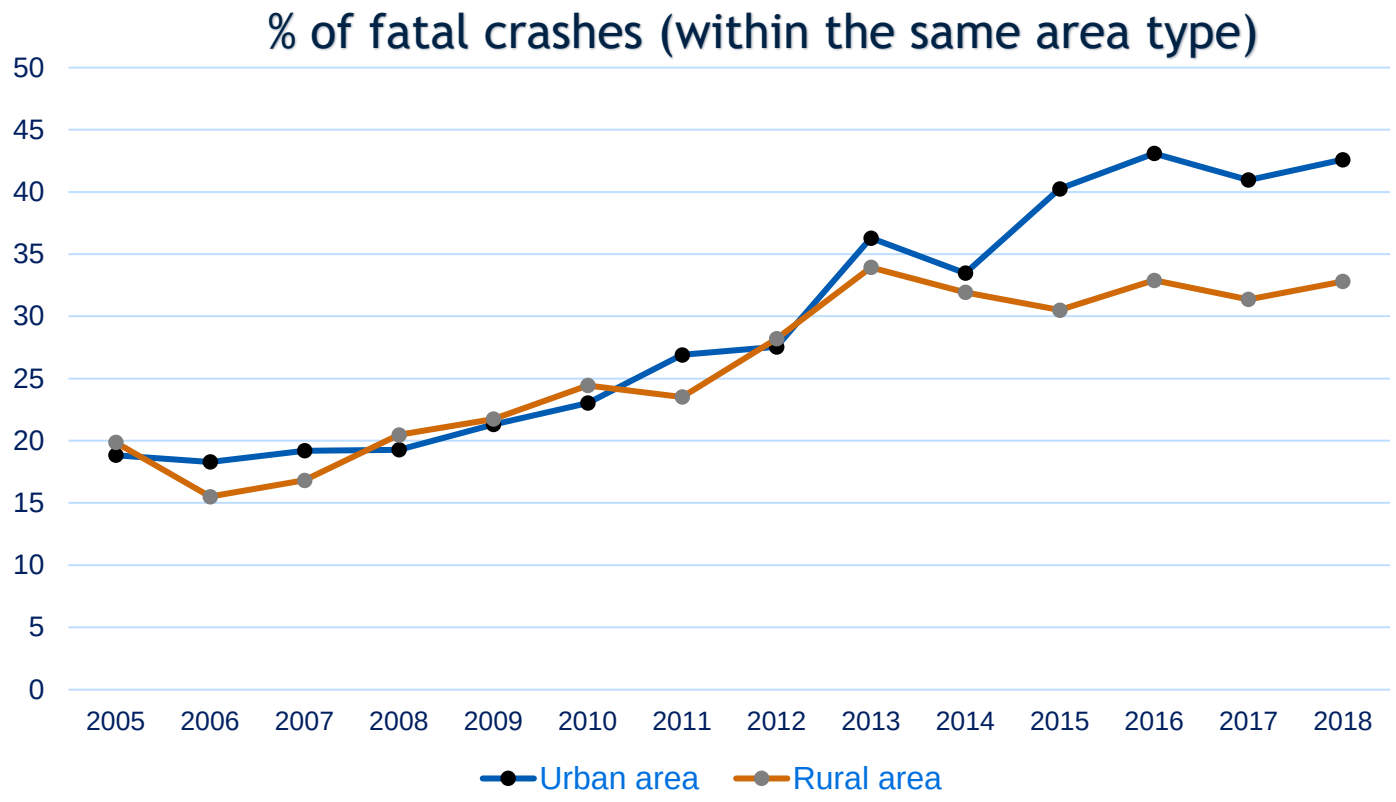
Huge challenge in rural areas

Risk factors:

- High speed
- Poor junction design
- High access point density
- No motorcycle facility

Source:
Motorcycle Crash Compilation 2013, Malaysia, HQ, mrchnew YouTube channel, 28 Sept 2013.

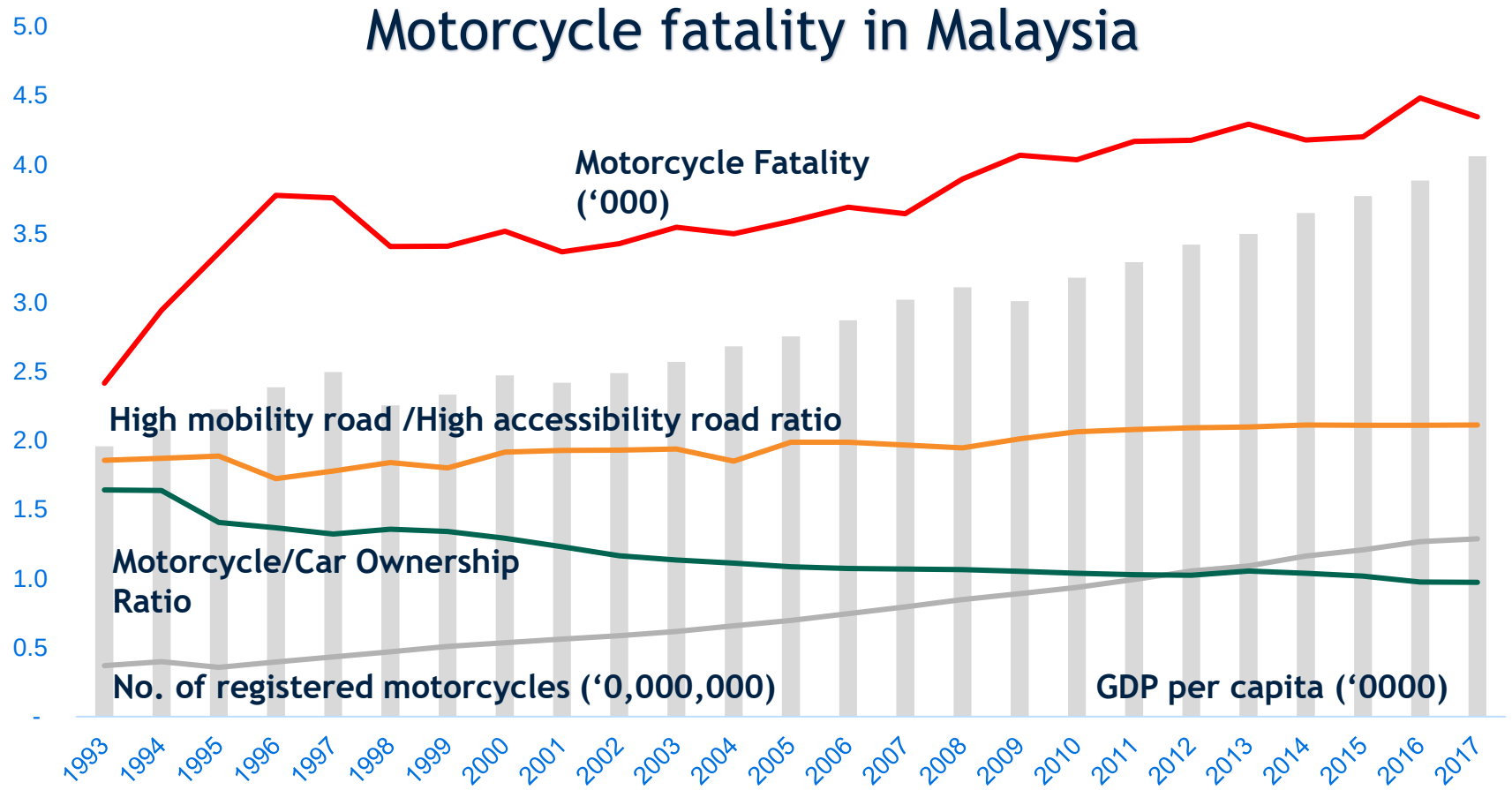
The pattern of fatal crashes in Malaysia is evolving…



% of fatal crashes out of total crashes

Rural areas	Urban areas
Year 2005	Year 2005
70%	30%
Year 2020	Year 2020
60%	40%

A lethal ‘concoction’ of (more cars + high mobility roads) for motorcyclists



We are providing a false sense of security to motorcyclists by building more high mobility roads with no dedicated facilities!

Common motorcycle KSI crashes in Kuala Lumpur

Comparison of risk

Non-intersection segment	Intersection segment
★★★	★★

Potential countermeasures:

- Improve decision sight distance
- Improve the design of channelizing islands

Common motorcycle KSI crashes in Kuala Lumpur

Comparison of risk

Straight segment	Curved segment
★★★	★★

Potential countermeasures:

- Improve road surface condition
- Improve curve superelevation
- Reduce the speed limit

Common motorcycle KSI crashes in Kuala Lumpur

3-lane carriageway

Operating speed	:	70km/h
Number of lanes	:	3
Distance to roadside object	:	1m – 5m
Paved shoulder	:	0m – 1m
Facilities for motorcycles	:	None
Curvature	:	Straight

Source: ITIS DBKL

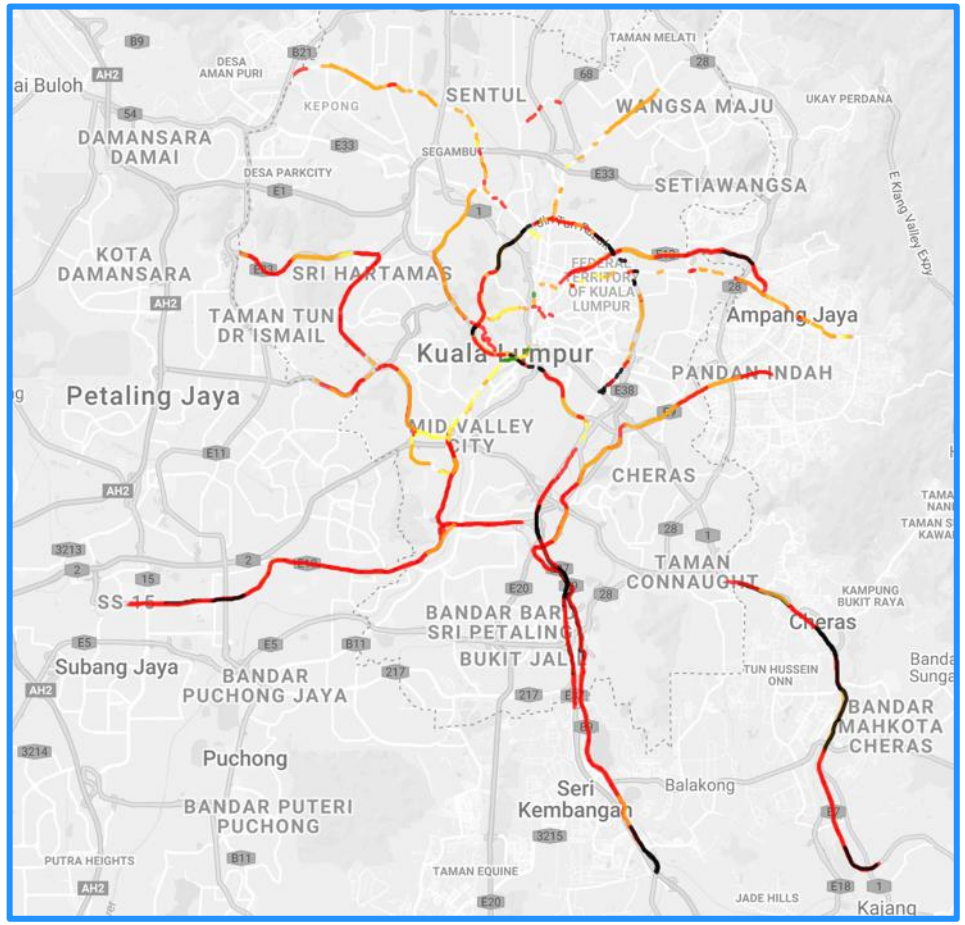
Comparison of risk

3-lane segment	2-lane segment
★★★	★★★

Potential countermeasures:

- Regulate riding lane position
- Reduce the speed limit

Upcoming BIGRS Projects in Kuala Lumpur



60% high-risk roads in 2020

Enhance professional training..

Monitor & evaluate policy....

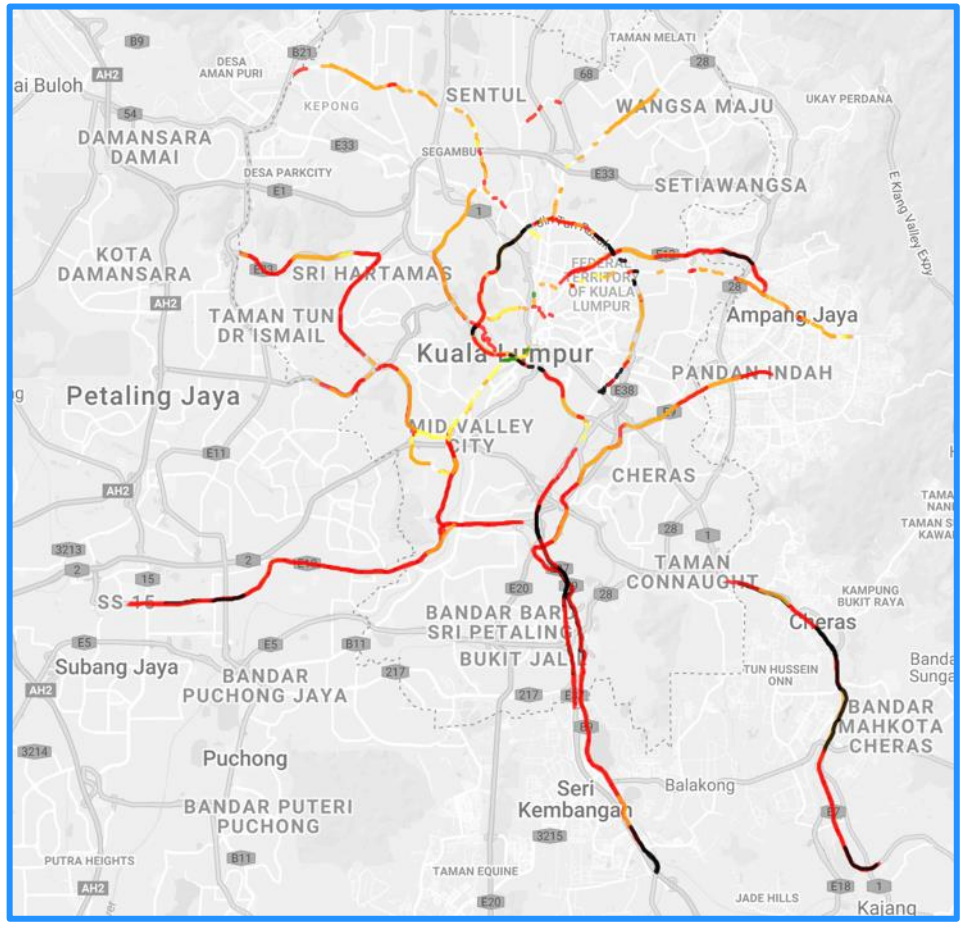
Infrastructure improvement projects..

Run mass media campaigns...

Support road safety laws..

25% high-risk roads by 2030

Upcoming BIGRS Projects in Kuala Lumpur – con't



Plans for safer motorcycling

1. Review speed limits in high risk areas.
2. Assess the viability of infrastructure treatments to ensure compliance with the desired speed environment.
3. Study the viability of setting new regulations on motorcycle riding position.

MyRAP and Motorcycle Safety in Asia

THANK YOU!

Questions?

Using crash data and Star Ratings: DRIVER and iRAP integration

Mirick Paala
Road safety consultant
World Bank

Using Crash Data and Star Ratings: DRIVER and iRAP Integration

DRIVER Overview

WHAT?

DRIVER – Data for Road Incident Visualization, Evaluation, & Reporting

Web-based and open-source system for geo-spatially recording & visualizing road crashes

A way to support multiple agencies as well as a means to standardize terms & definitions for reporting crash data

A suite of visualization tools to support data-driven decisions & a platform for monitoring the impact of interventions

HOW?

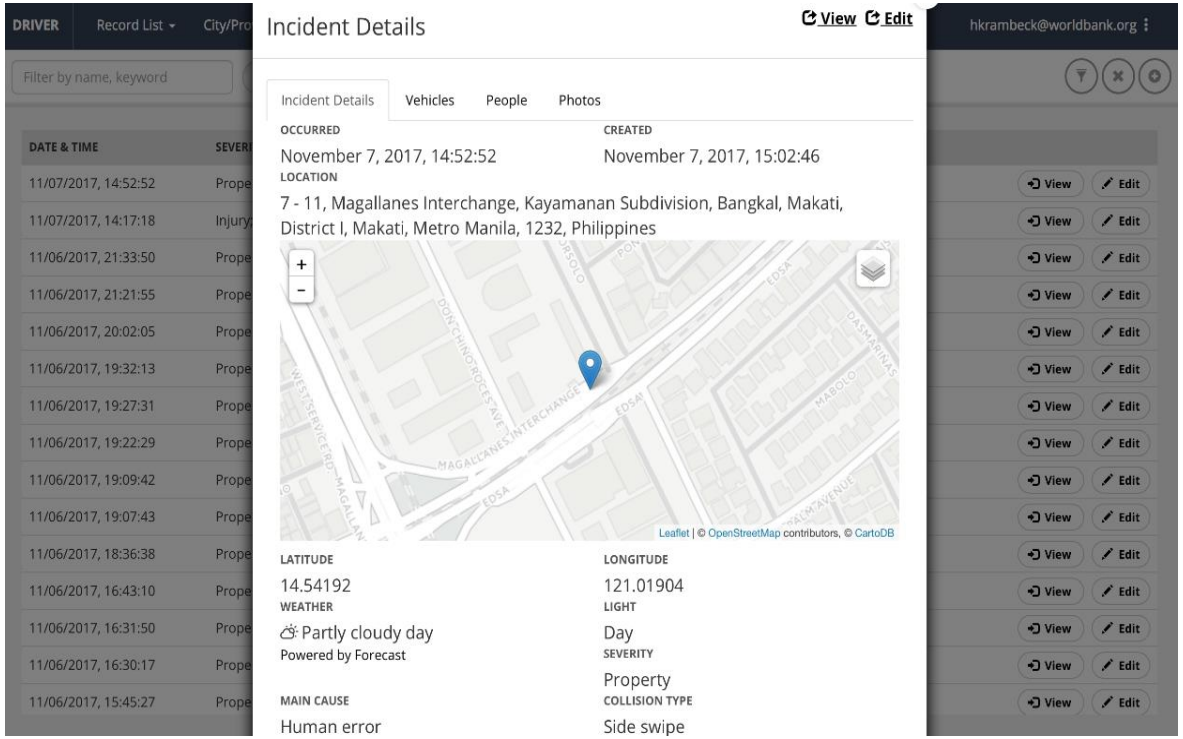
Available for free on Bank's open-source code repository: https://github.com/WorldBank-Transport/DRIVER

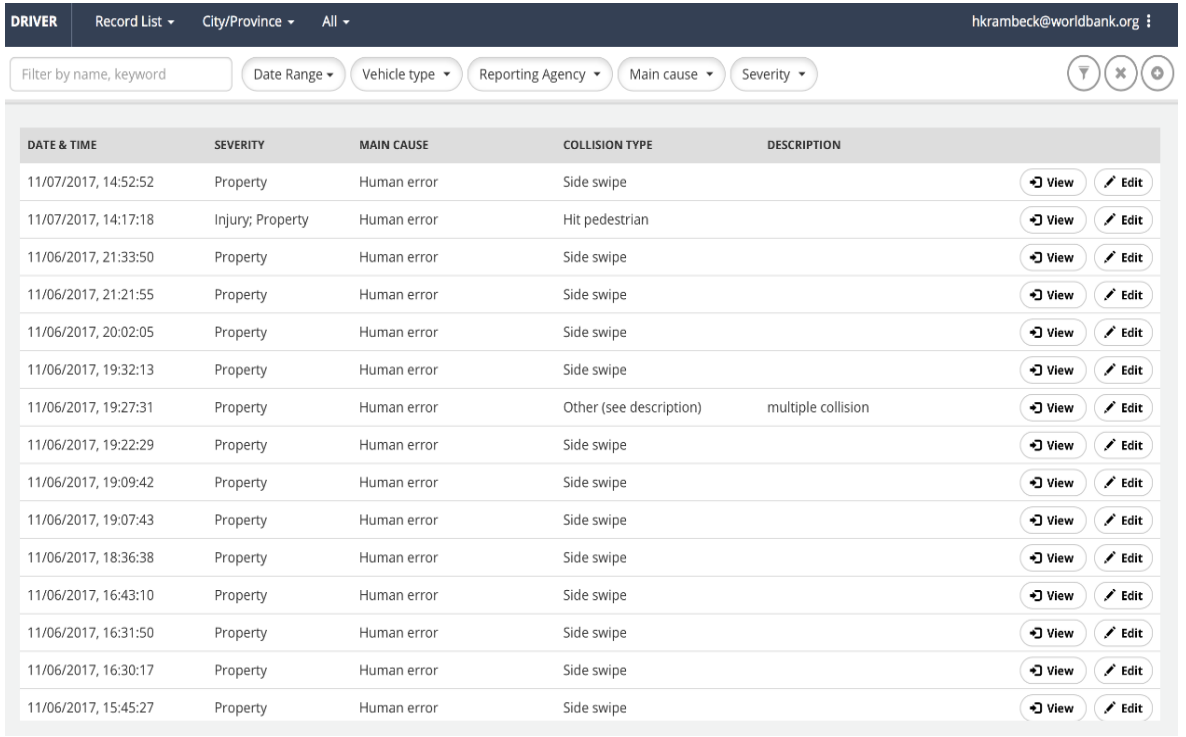
Available wherever Open Street Map is available

Fields/variable easily modifiable

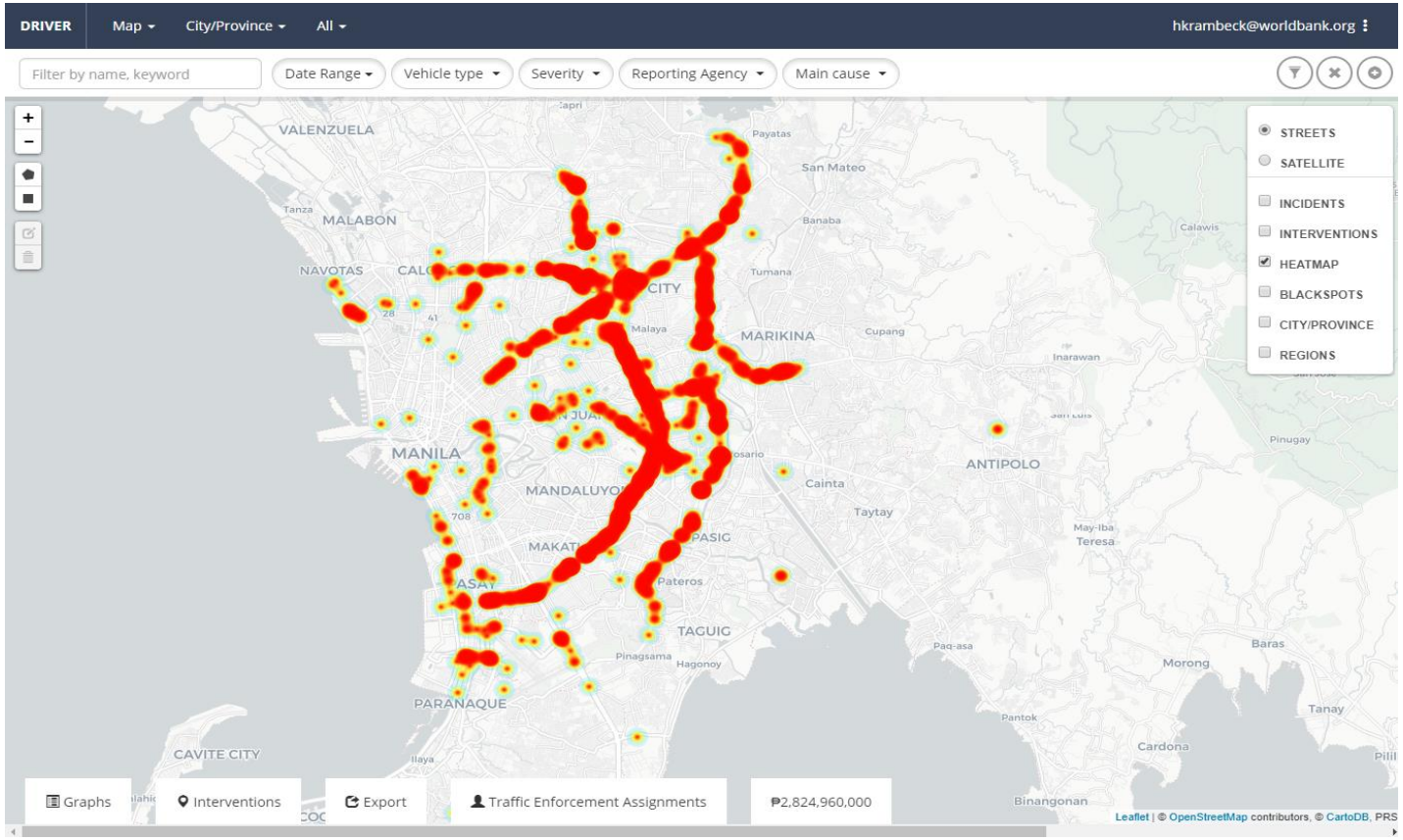
Can be adapted and maintained by local developer

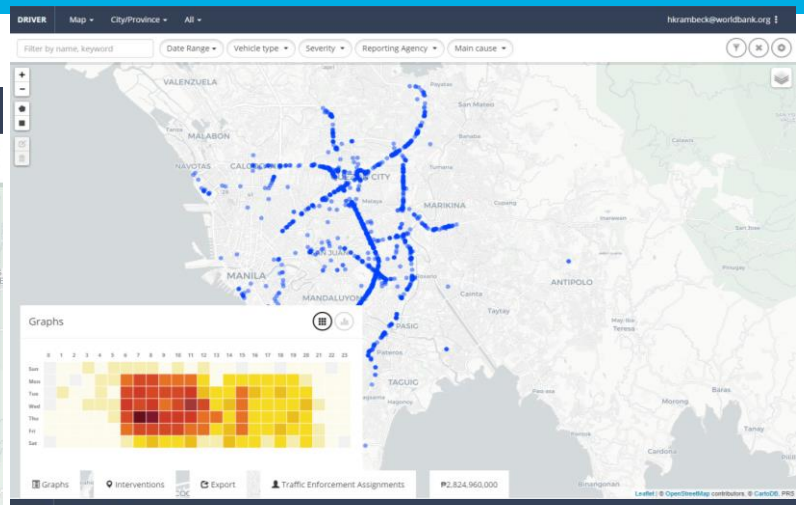
Incident Reporting



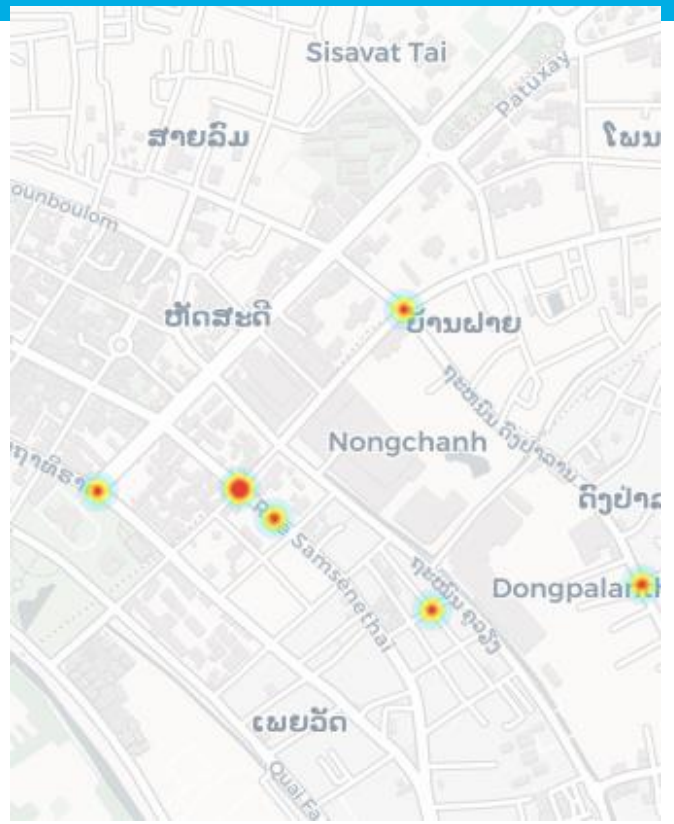


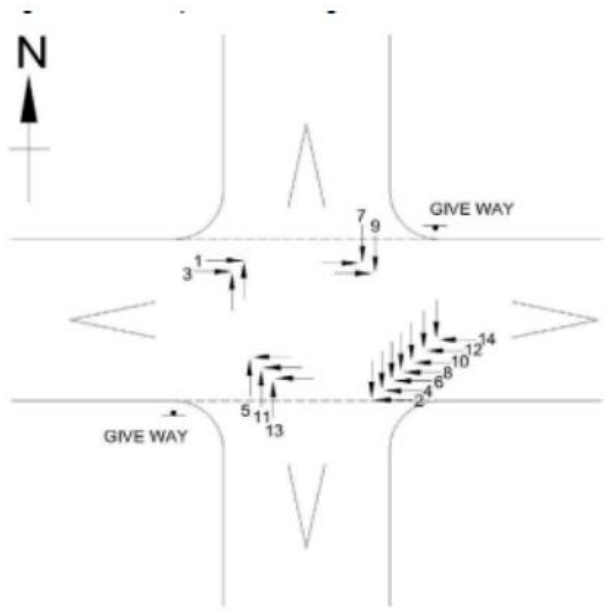
Data Visualization





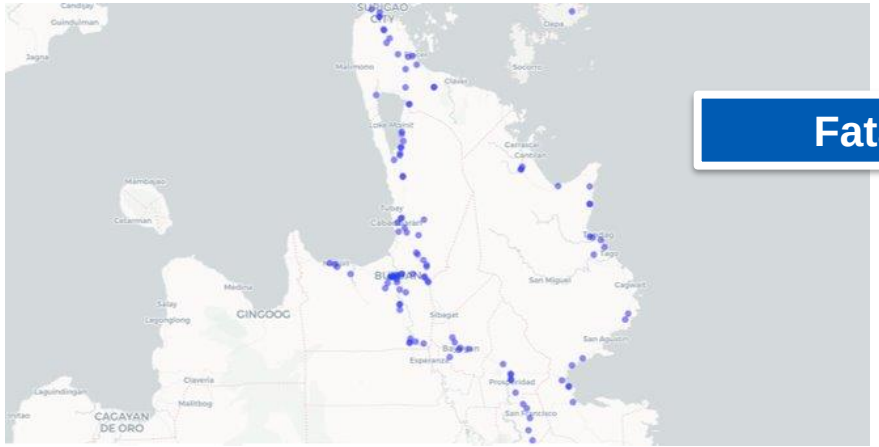
Site Investigation

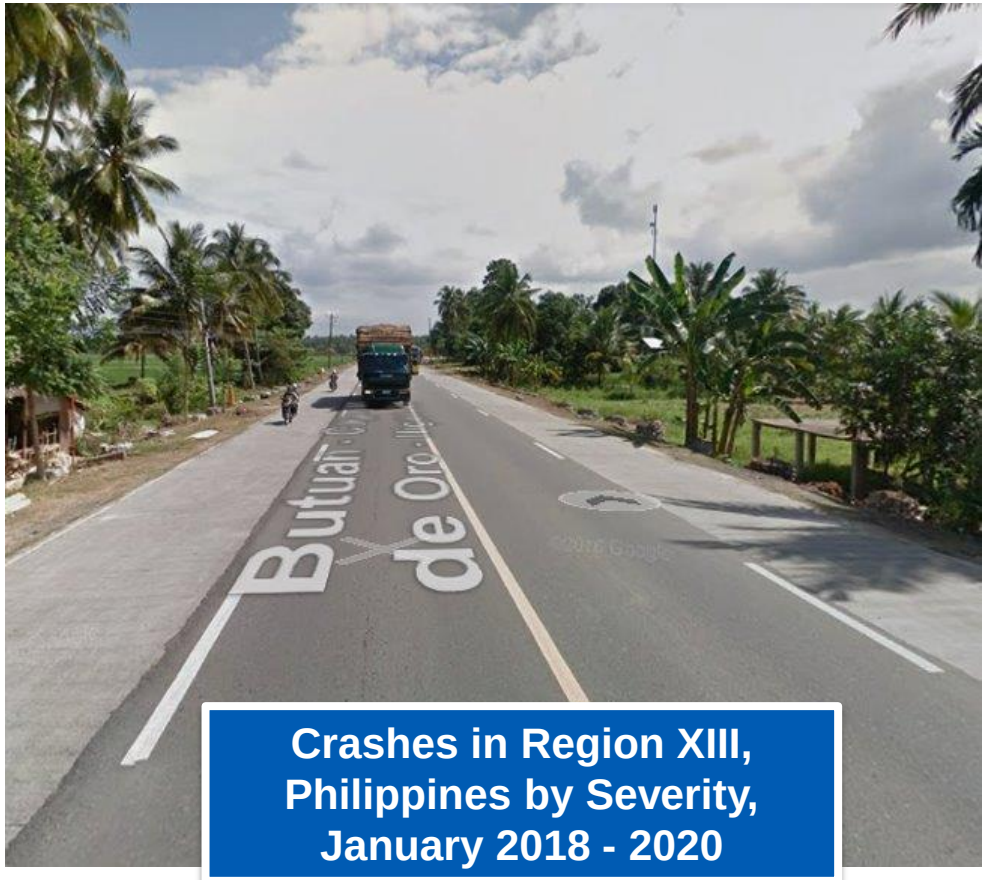




Fatal and Serious Injury Crashes in Vientiane, Lao PDR, 2017-2018

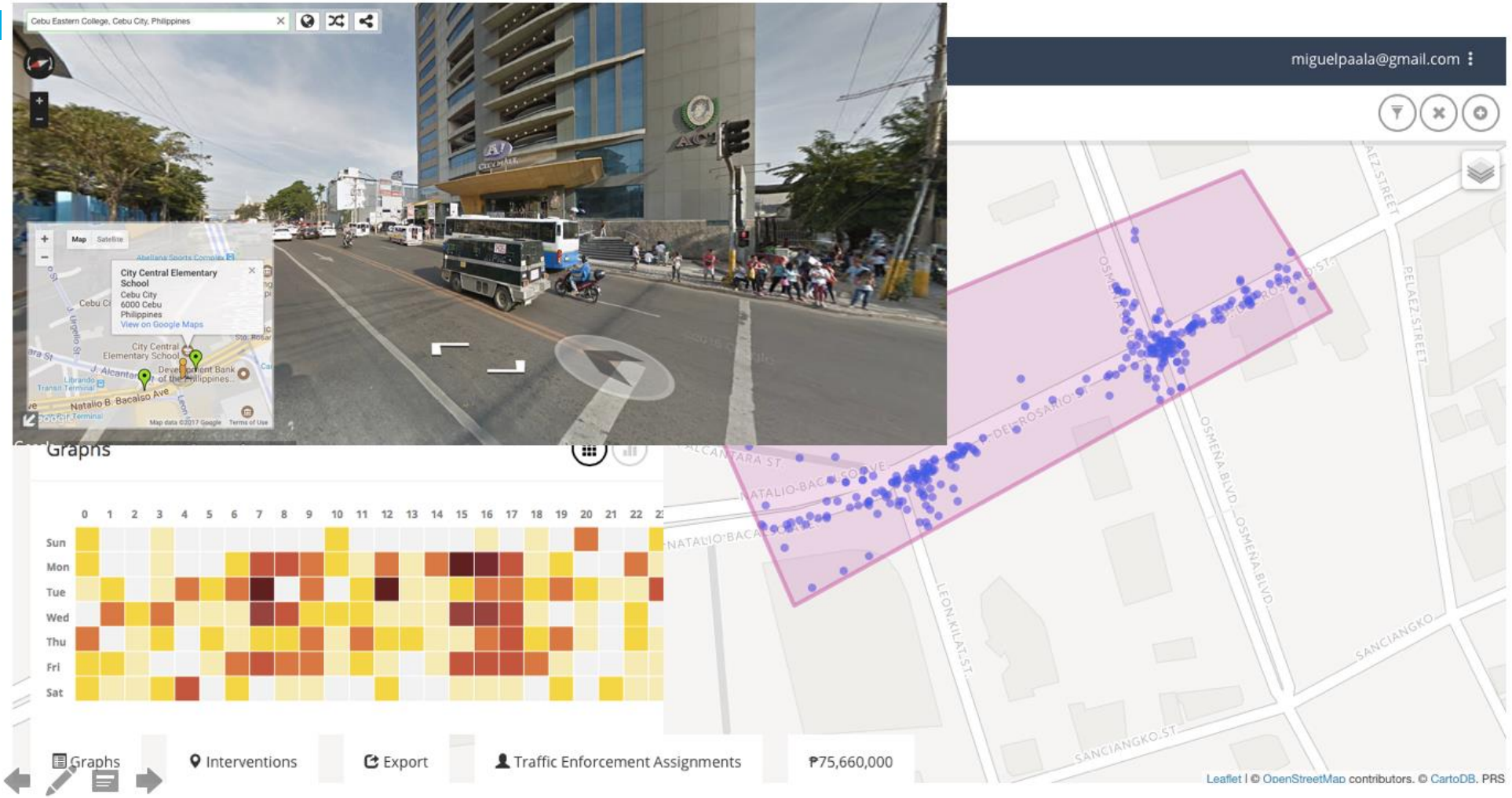
High-risk Locations



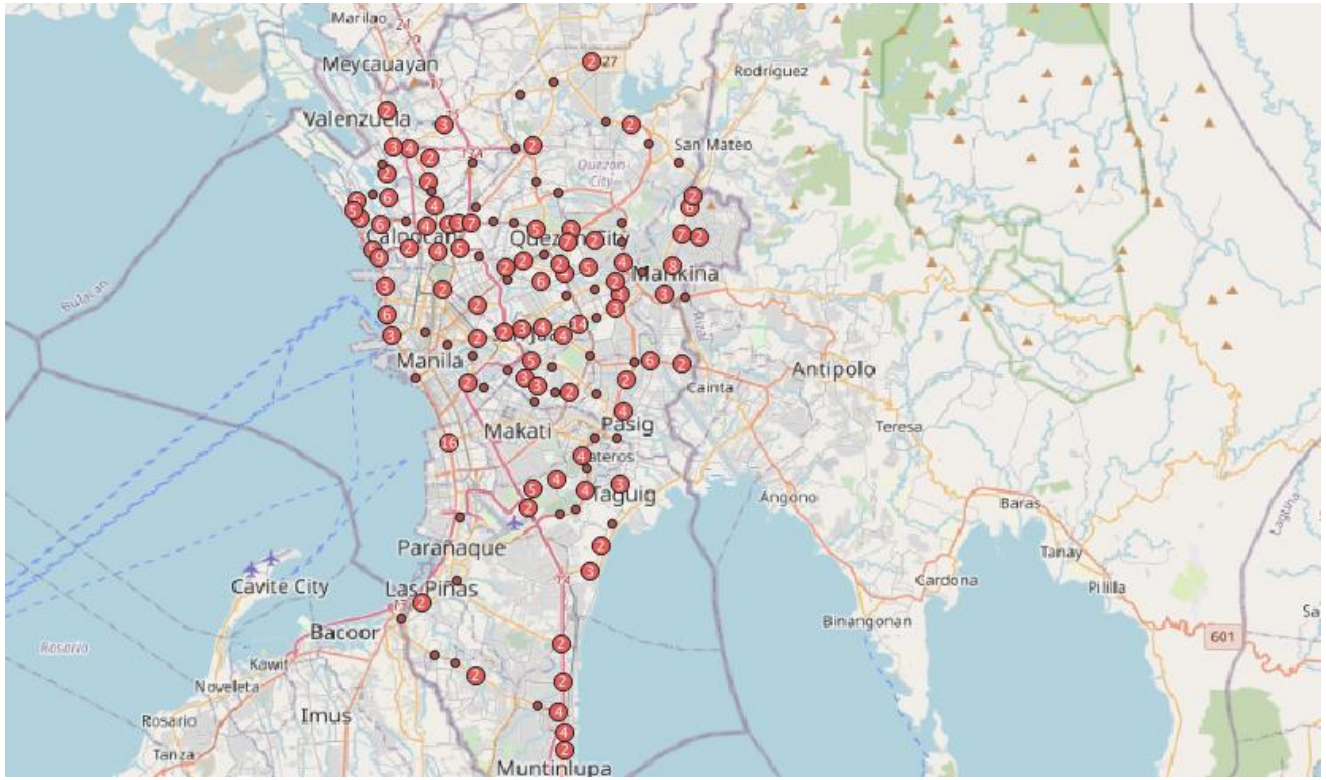


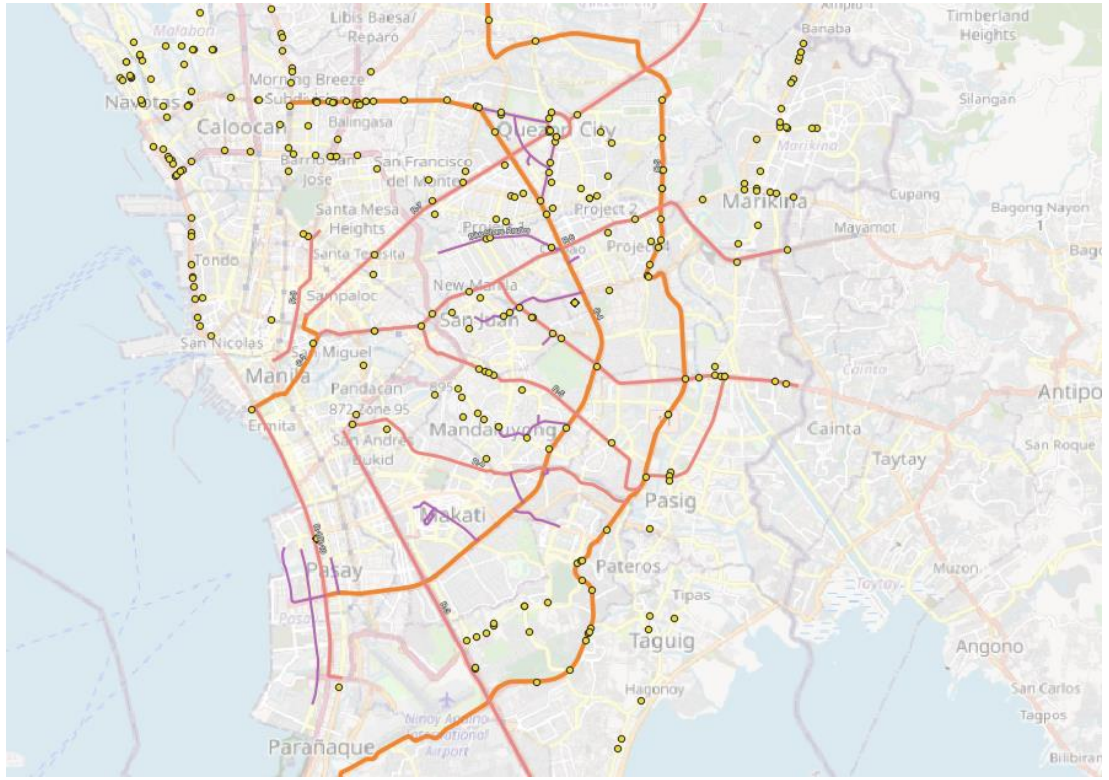
Crashes in Region XIII, Philippines by Severity, January 2018 - 2020

School Zones



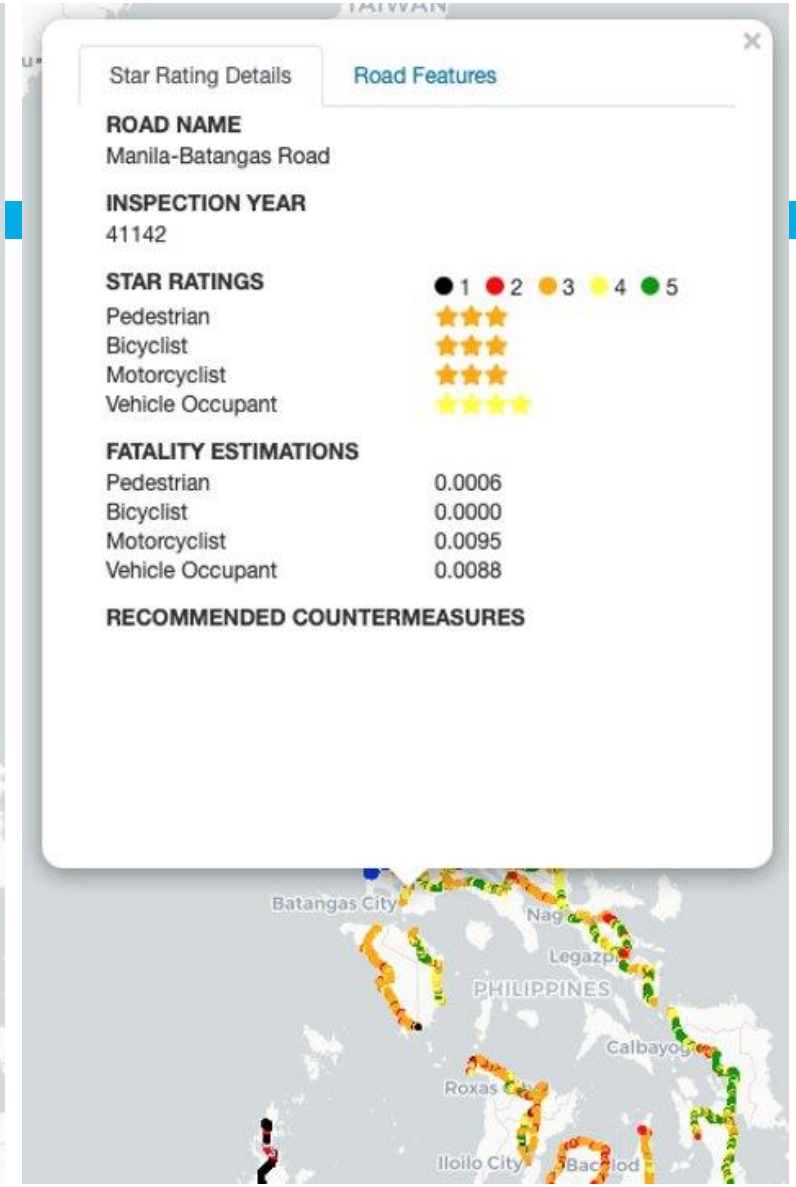
Cycling Infrastructure



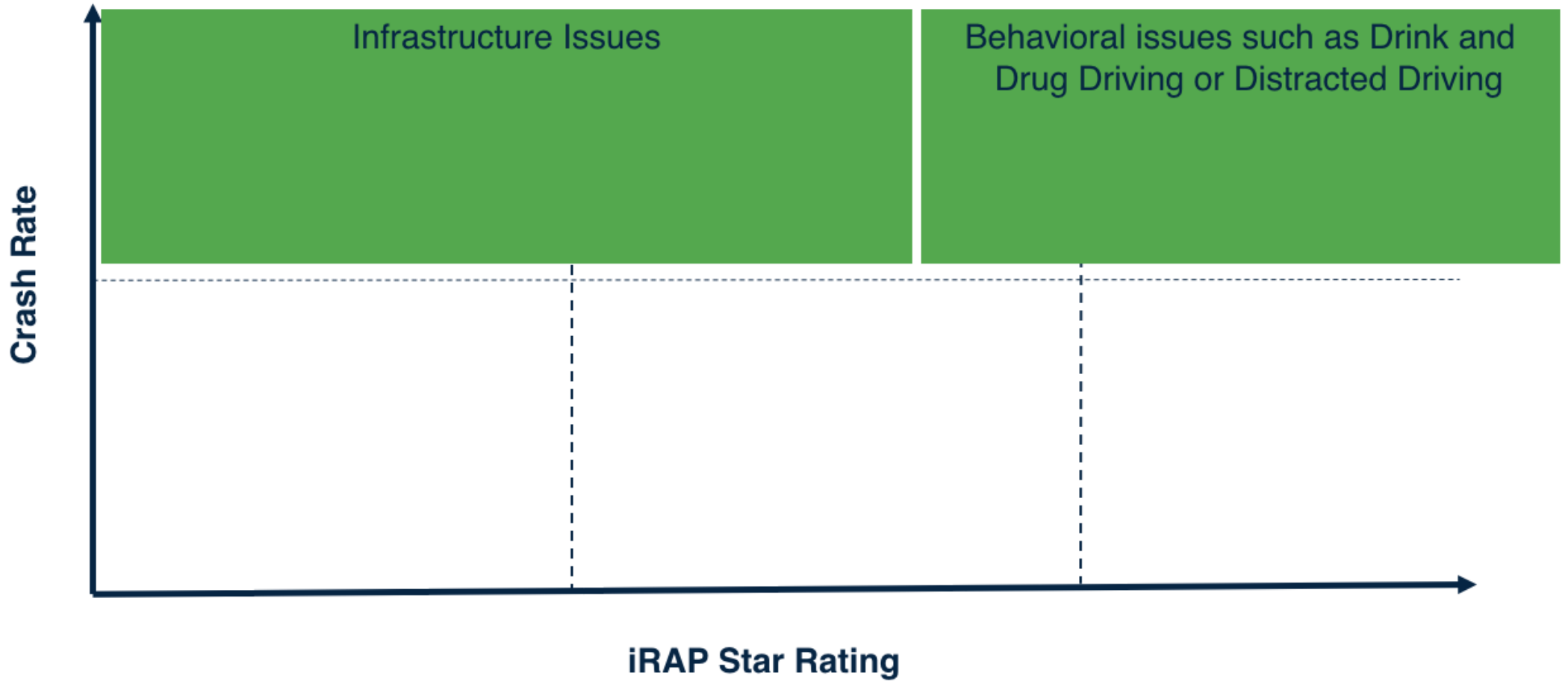


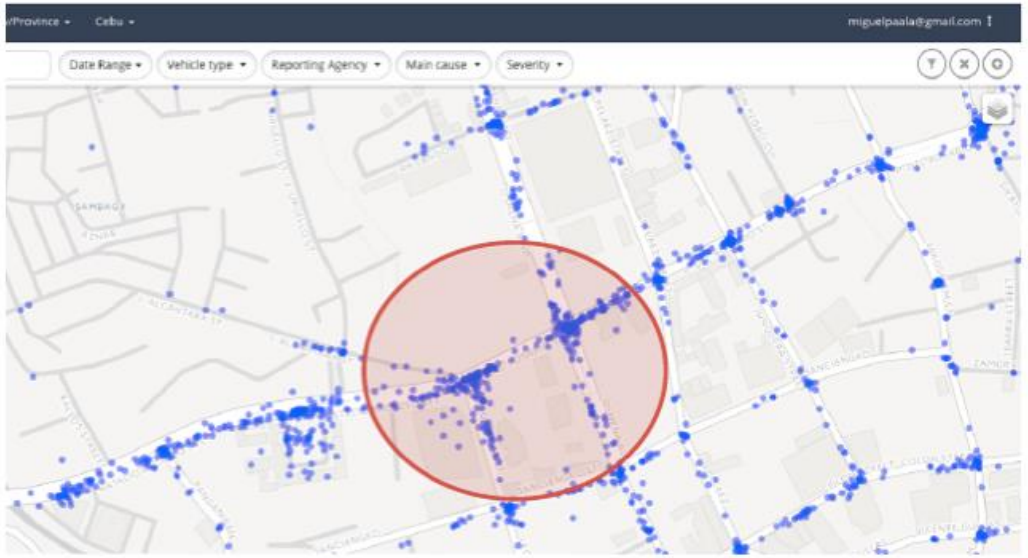
iRAP Star Rating

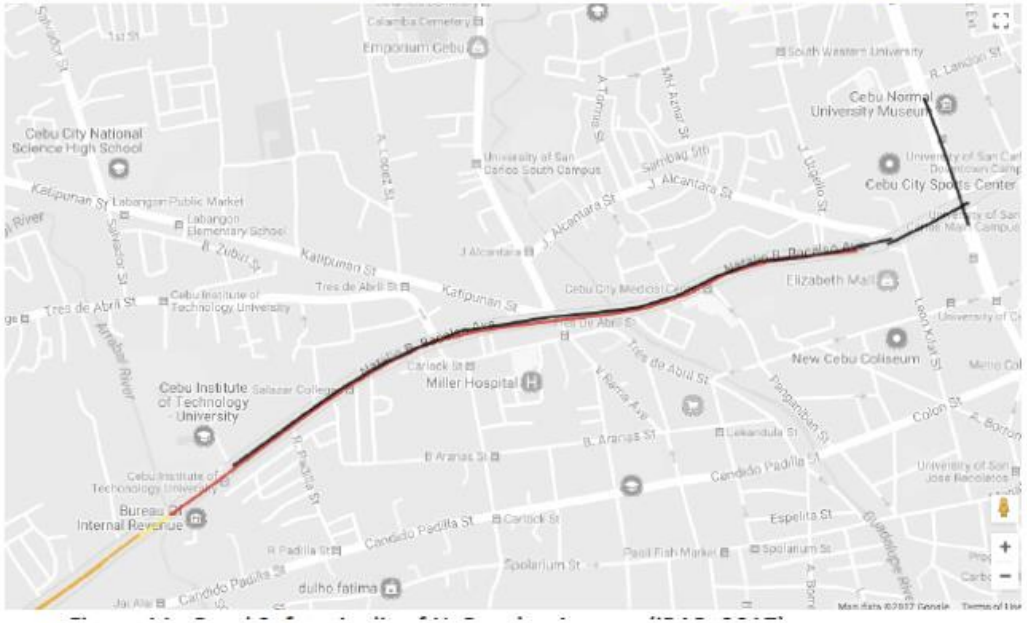
The iRAP Star Rating gives a simple, objective measure of infrastructure safety for every road user type.



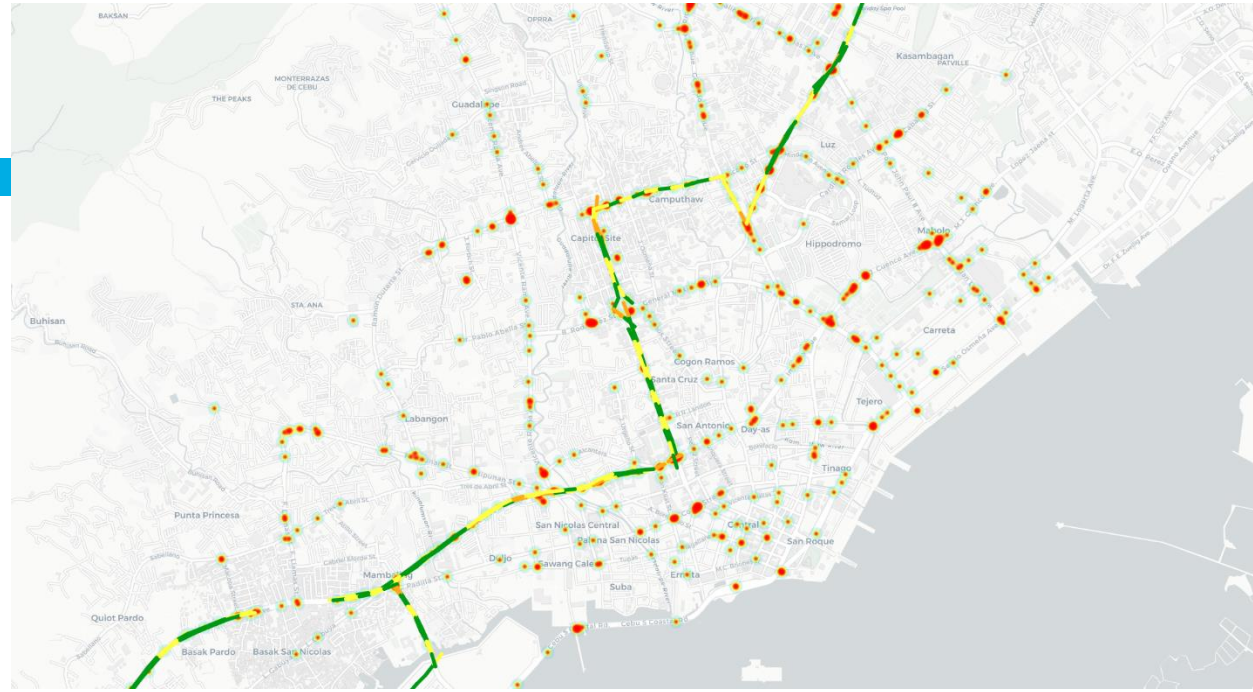
Integration of iRAP and Crash Data



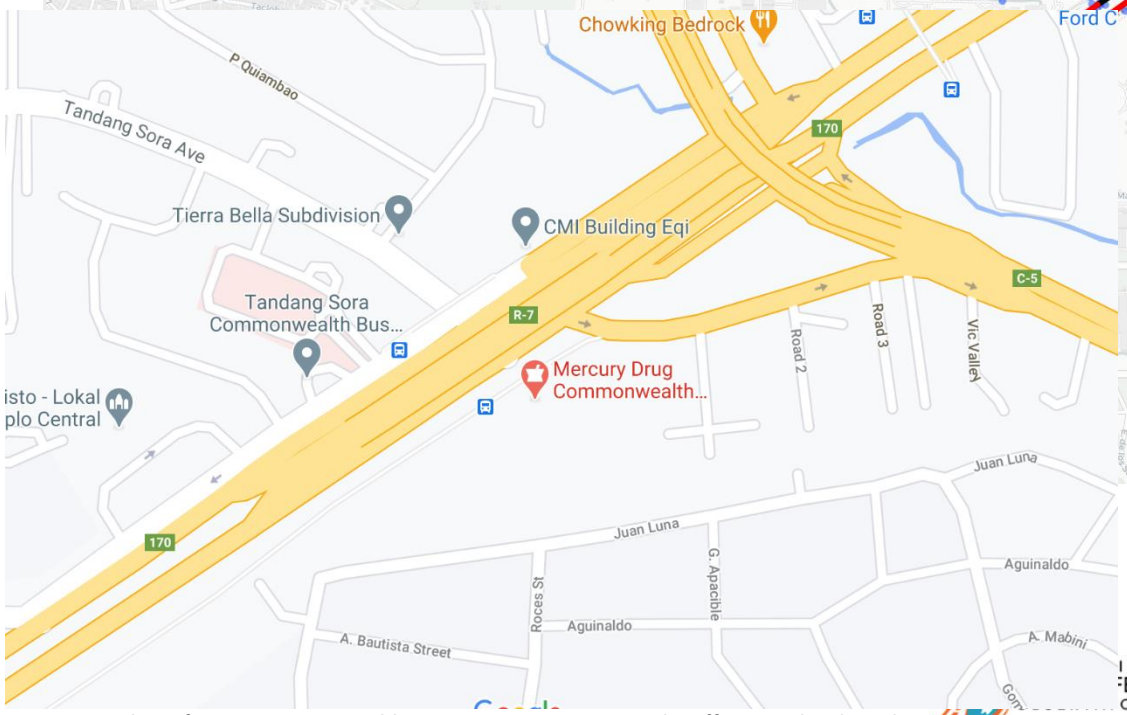


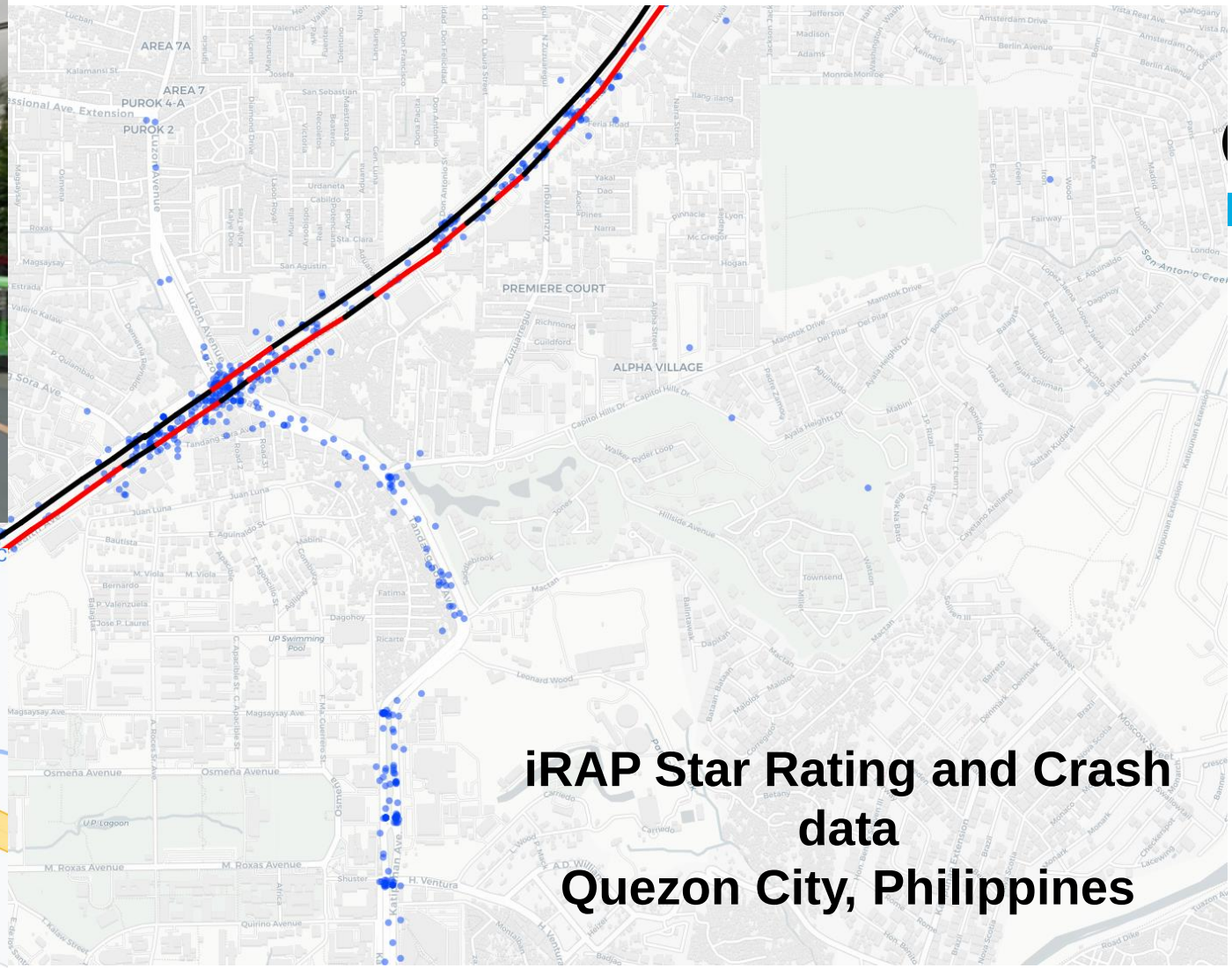


iRAP Star Rating and Crash data in Cebu City Elementary School



iRAP Star Rating and Crash data in Cebu City





iRAP Star Rating and Crash data
Quezon City, Philippines

Questions?

Star Rating for Designs (SR4D) in Fiji and Samoa

Luke Rogers
Global Operations Manager
iRAP

Global Plan: Decade of Action for Road Safety 2021-2030

Recommended actions to improve the safety of road infrastructure:

"Undertake road safety audits on all sections of new roads (pre-feasibility through to detailed design) and complete assessments using independent and accredited experts to ensure a minimum standard of three stars or better for all road users"

STAR RATING FOR DESIGNS
SAFE ROADS, RIGHT FROM THE START

ASIA-PACIFIC ROAD SAFETY OBSERVATORY · ADB · THE WORLD BANK · GRSF Global Road Safety Facility · Bloomberg Philanthropies INITIATIVE FOR GLOBAL ROAD SAFETY · iRAP · GLOBAL ROAD SAFETY PARTNERSHIP

Kings Road Upgrade Project (KRUP) Fiji

https://www.fijiroads.org/photo-gallery/

- Rehabilitation of 14 existing sections of Kings Road (54.8km)
- Major road sections in the northern and eastern part of Viti Levu
- Estimated annual FSIs on the corridor: 21 (costing an estimated FJD 6 million/yr)
- Upgraded under the WB and ADB joint-funded Transport Infrastructure Investment Sector Project (TIISP)
- Improving access to socio-economic opportunities by supporting the government to upgrade land and maritime transport infrastructure

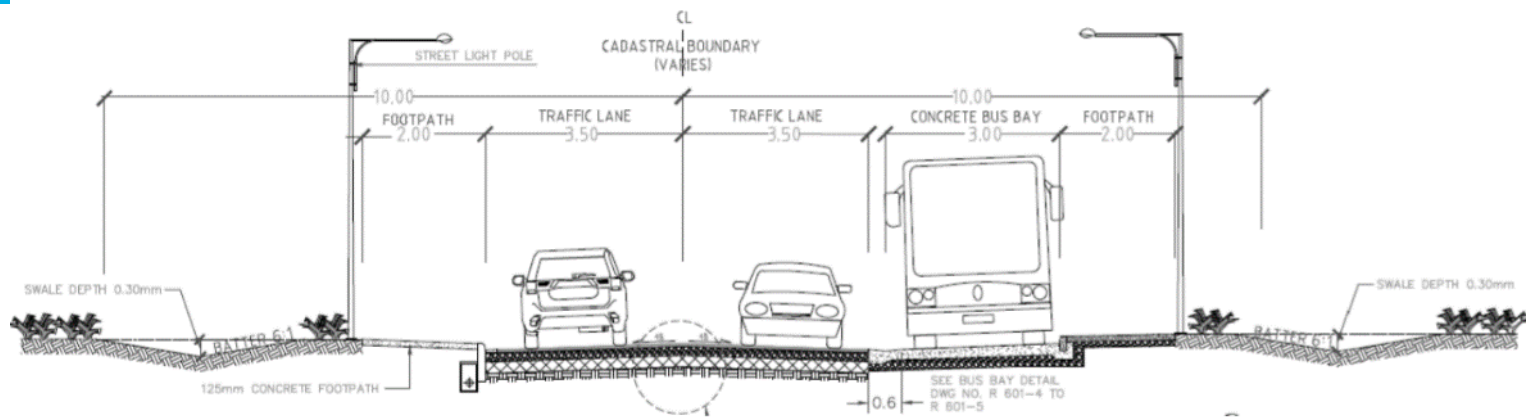
Kings Road Upgrade Project (KRUP) Fiji

- iRAP invited to assess the proposed upgrades (designs) to independently measure the level of risk for all road users (vehicle occupants and pedestrians) to ensure a 3-star standard or better
- Identify low-cost, economically viable road safety countermeasures for further consideration
- Review of intial designs in 2020
- Review of detailed designs currently underway


https://www.fijiroads.org/photo-gallery/

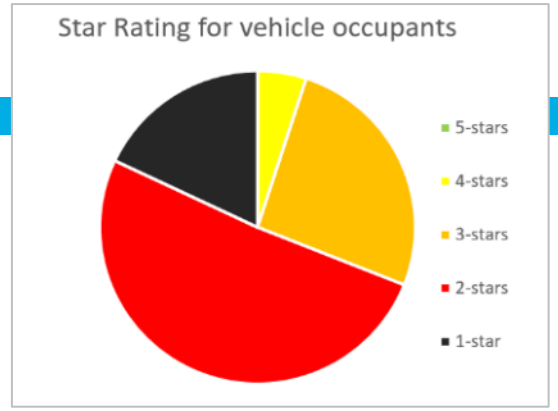
Kings Road Upgrade Project (KRUP) Fiji

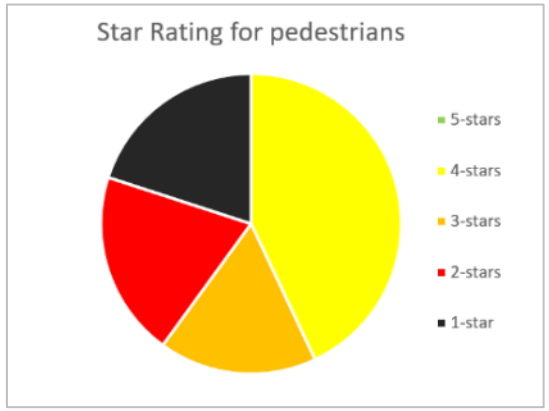
Key Road Design Features



- Paved shoulders
- Improved road delineation (inc. road markings and signs)
- New street lighting in urban (village/town) areas
- Intersection improvements and wide centre line
- New pedestrian crossing facilities and sidewalks in urban areas

Kings Road Upgrade Project (KRUP) Fiji





Results from review of initial designs (2020)

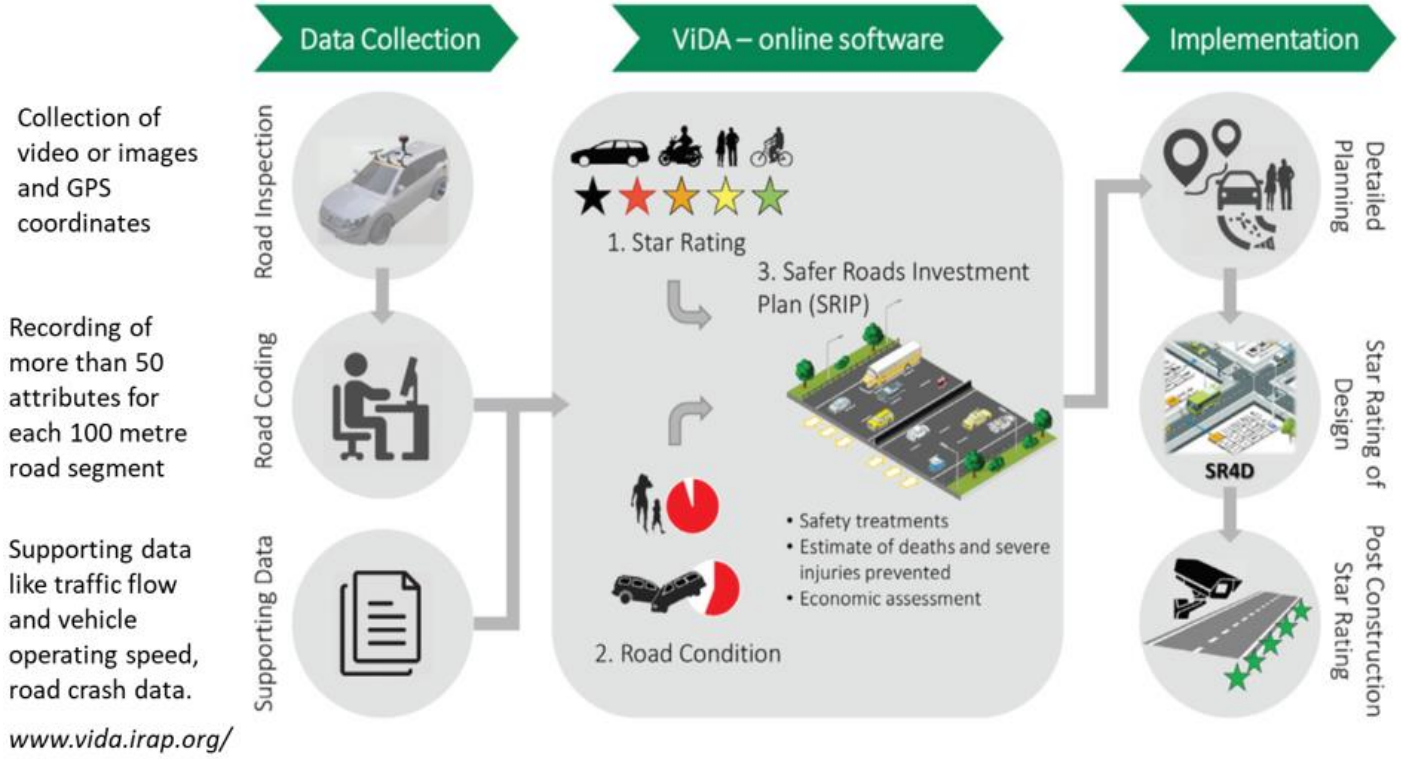
- 3-star or better for vehicle occupants: 31%
- 3-star or better for pedestrians (where present): 60%
- Estimated annual average FSIs reduced from 21 to 7
- Identified several additional countermeasures (reducing hazardous roadsides, improving curve delineation, pedestrian facilities) with BCR 2

Samoa: Central Cross Island Road Upgrading Project

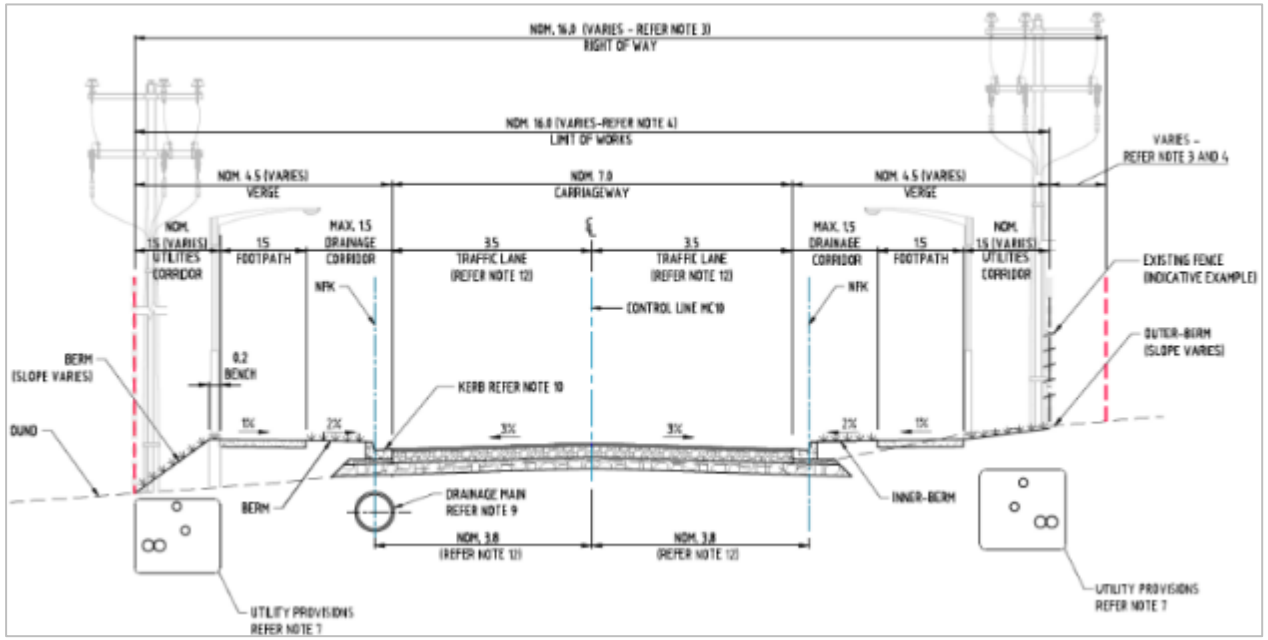
- ADB funded project will finance the upgrade of 20km of national road
- Key arterial road in Upolu (most populated of the Samoan Islands)
- Incorporating climate-proofing considerations, innovative technologies and road safety measures
- 3-star target

Samoa: Central Cross Island Road Upgrading Project

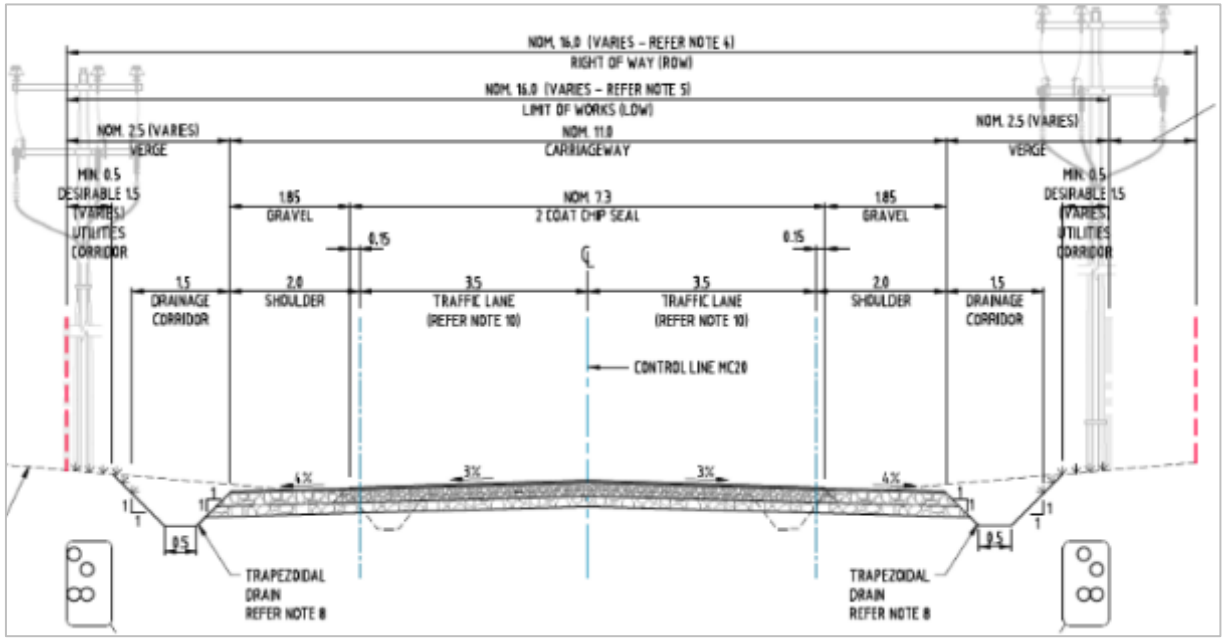
- iRAP invited to produce baseline Star Ratings for the existing road and for the proposed design
- Plus suggested countermeasures that will further reduce road user risk and achieve a 3-star or better result for vehicle occupants and pedestrians



Samoa: Central Cross Island Road Upgrading Project



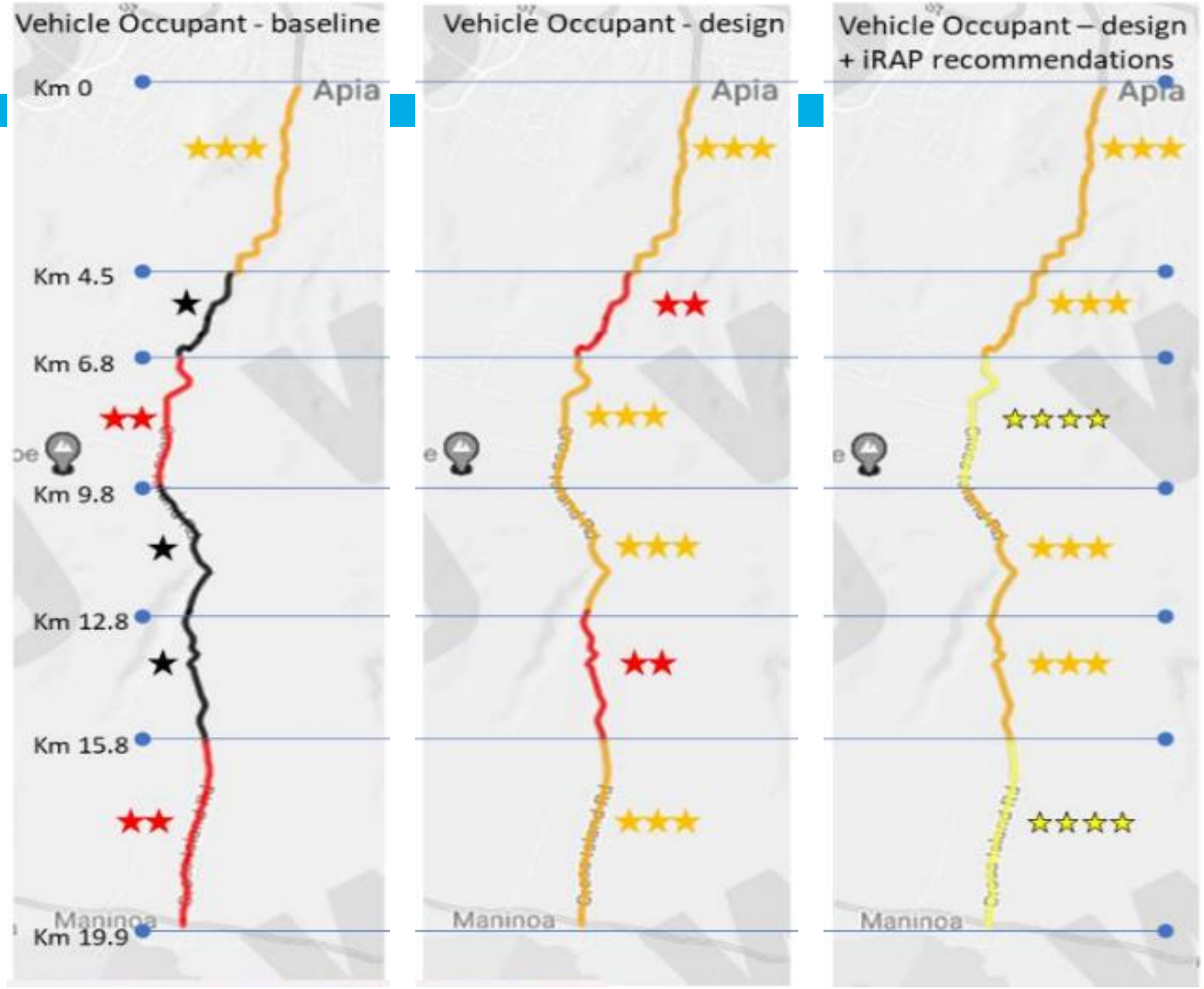
Typical cross-section in urban area Package-1 (Km 0 to Km 3+127)

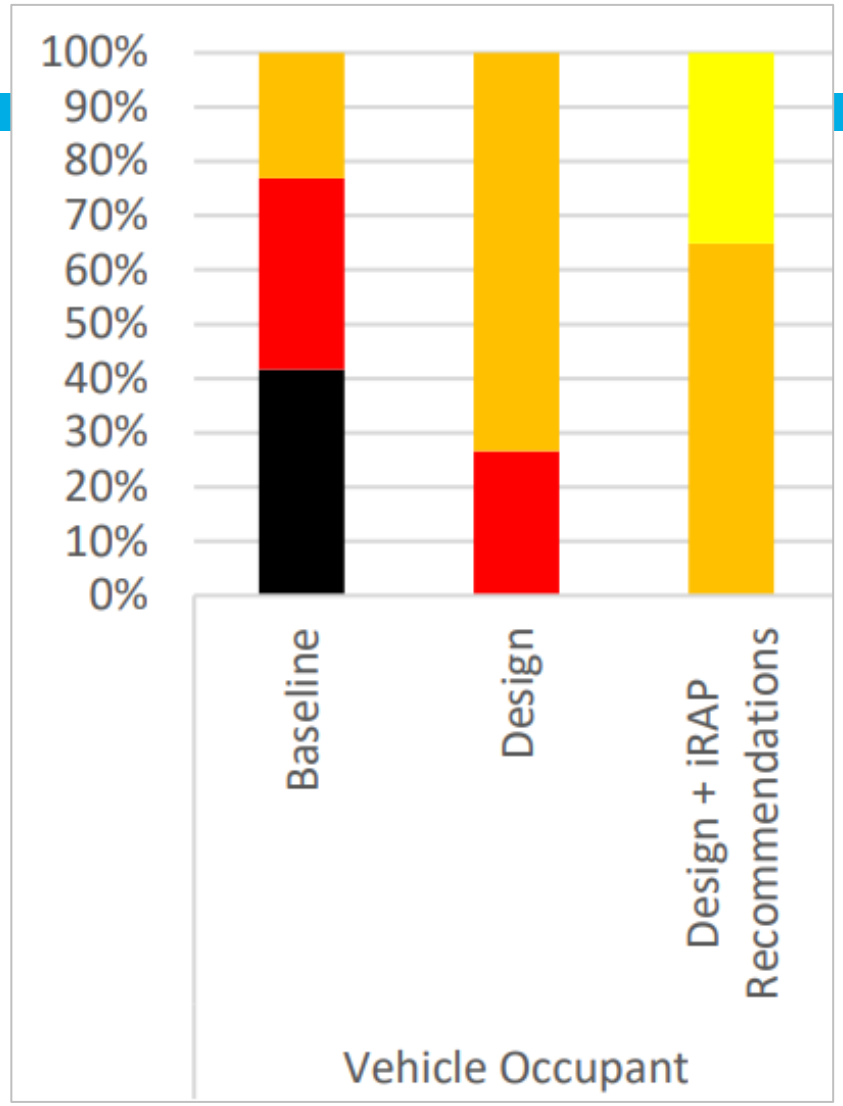


Typical cross-section in rural area Km 4+420 to Km 19+686

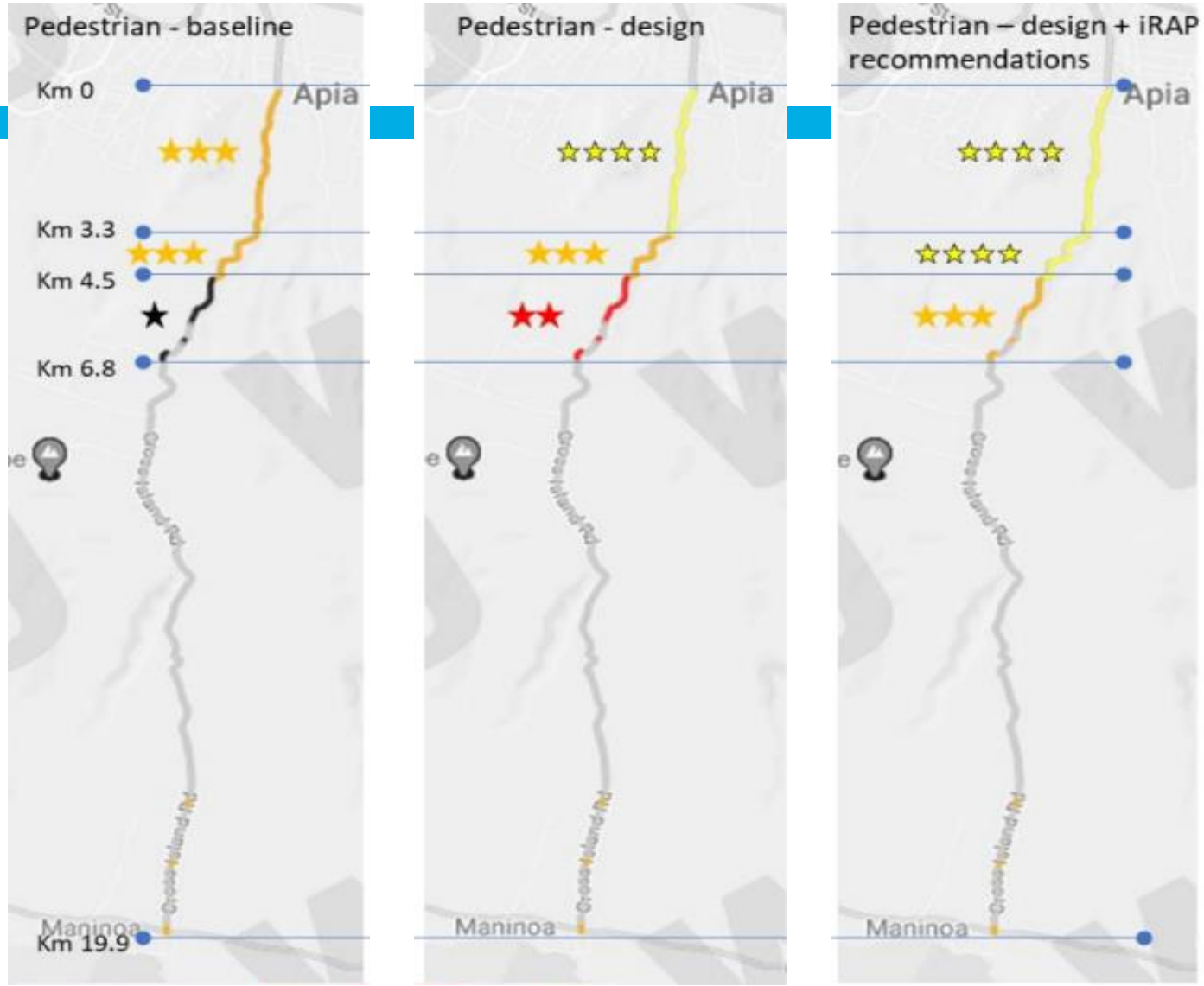
Samoa: Central Cross Island Road Upgrading Project

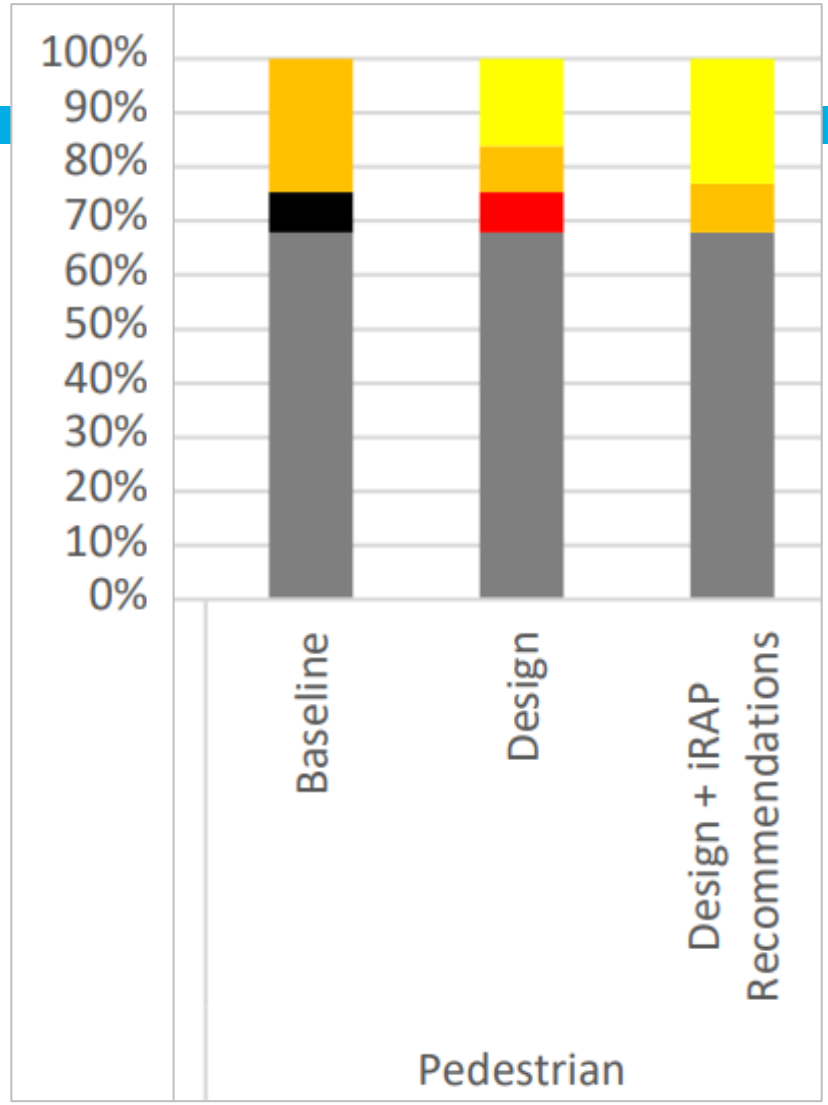
Samoa: Central Cross Island Road Upgrading Project





Samoa: Central Cross Island Road Upgrading Project





Summary

STAR RATING FOR DESIGNS
SAFE ROADS, RIGHT FROM THE START

- Key requirement for client/road authority to specify that assessments be undertaken to ensure a minimum standard of three stars or better for all road users

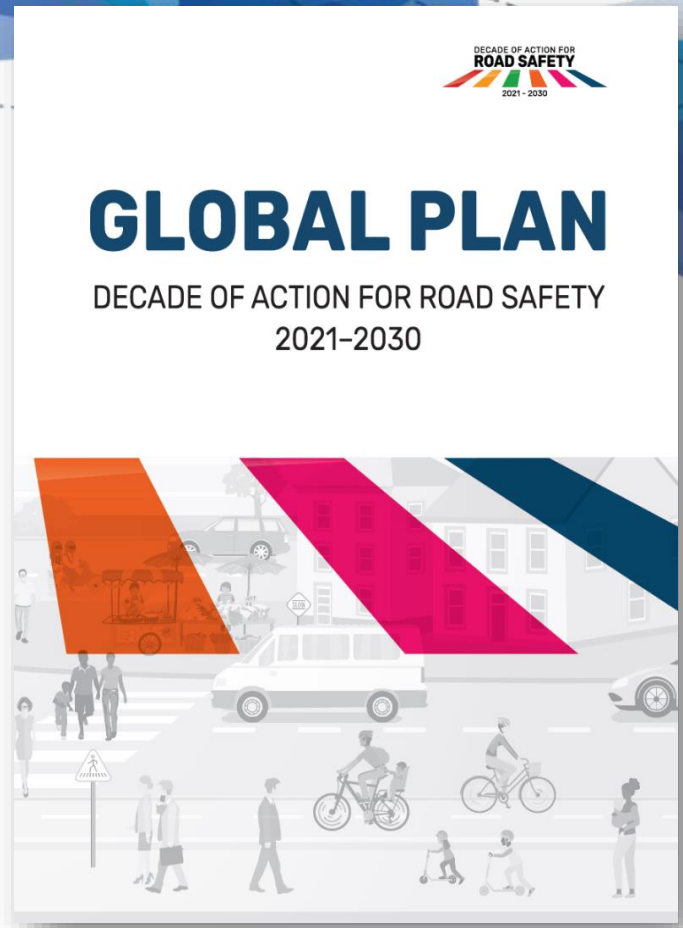
- Independent accredited suppliers, see https://irap.org/accreditation/

- Star Ratings for Designs (SR4D): a free tool and evidence-based programme of applications to enable the simple and objective measure, and improvement, of the level of safety 'built-in' to a road design

Questions?

Establishing ThaiRAP and light Star Ratings

Kasem Choocharukul Professor
Chulalongkorn University



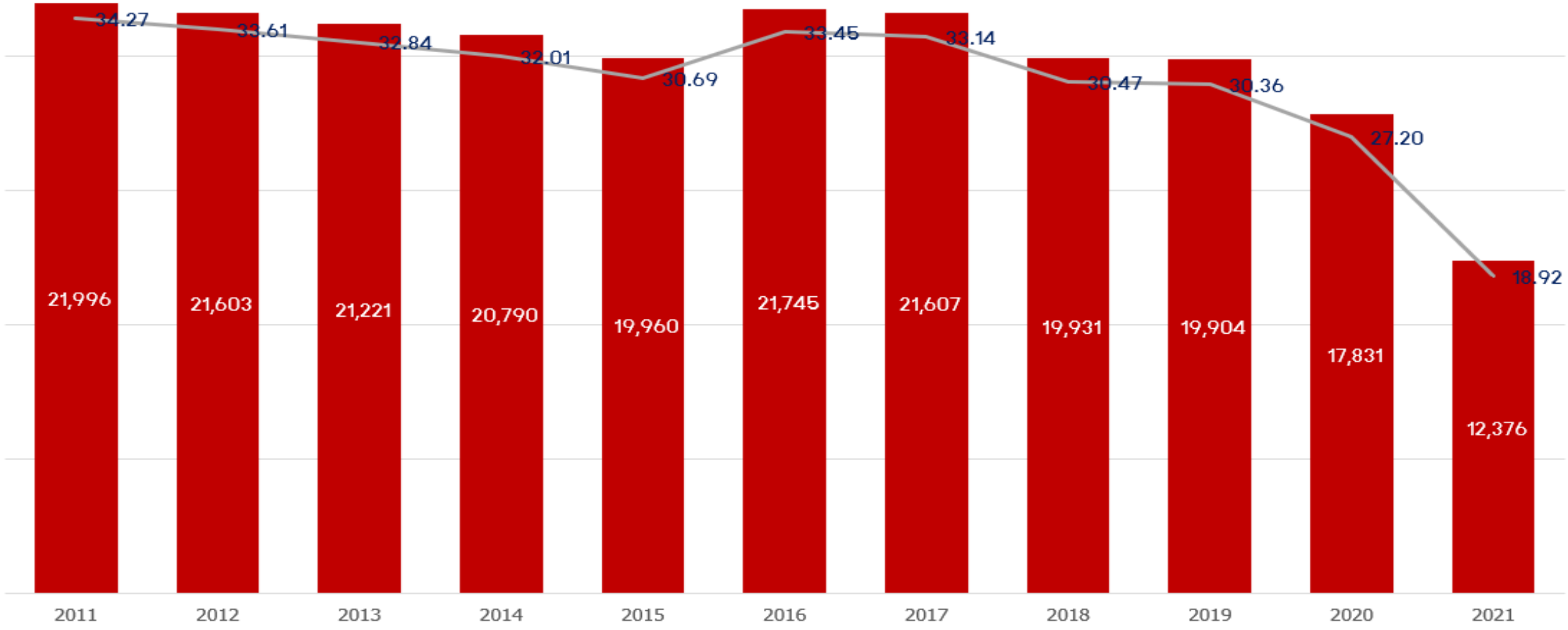
Presentation Overview

- Current road safety situation
- Establishing ThaiRAP
- Light Star Ratings
- Big data integration

Road Infrastructure Network

Road Type	Road Authority	Length (km)
Major and Minor Road and Expressway	Department of Highways	51,984
Major and Minor Road	Department of Rural Roads	48,031
Local Road	Department of Local Administration	597,667
Local Road	Bangkok Metropolitan Administration	4,074
Expressway	Expressway Authority of Thailand	225
Total		701,981

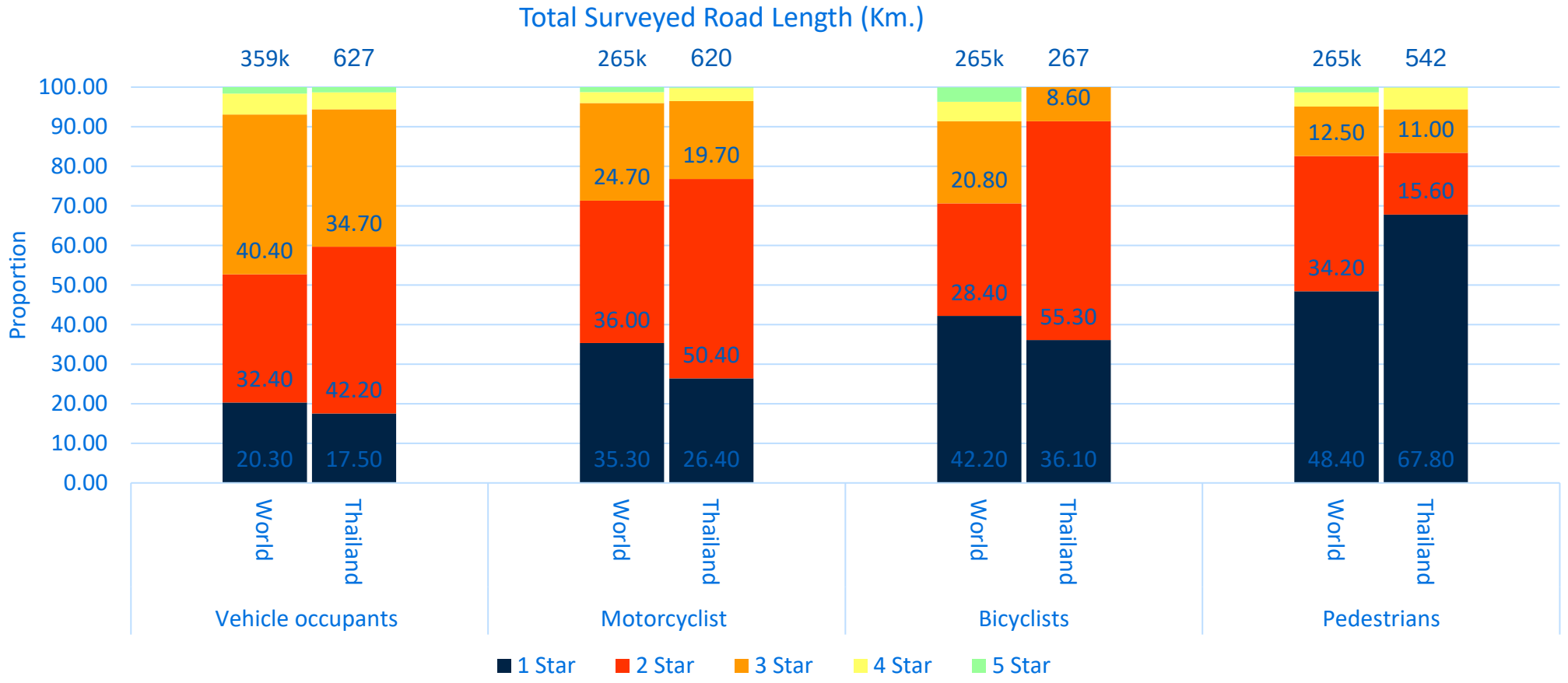
Road Fatality Trends in Thailand



Source: Division of Injury Prevention, Department of Disease Control, Ministry of Public Health

Distribution of Star Ratings by Road User Group

Worldwide vs. Thailand Comparison



ThaiRAP Centre of Excellence

CHULA ENGINEERING
Foundation toward Innovation

arrb TRL imt

MRIGlobal

LabTrans

KOTI THE KOREA TRANSPORT INSTITUTE

SWOV
WETENSCHAPPELIJK

MIROS
MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH

ASIA-PACIFIC ROAD SAFETY OBSERVATORY

ADB

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

GRSF
Global Road Safety Facility

Bloomberg Philanthropies
INITIATIVE FOR GLOBAL ROAD SAFETY

iRAP

GLOBAL ROAD SAFETY PARTNERSHIP

ThaiRAP as one of regional RAPs

EuroRAP AusRAP usRAP KiwiRAP

ChinaRAP IndiaRAP BrazilRAP SARAP

ThaiRAP MyRAP

Chula Engineering as one of iRAP COE

arrb TRL imt LabTrans KOTI THE KOREA TRANSPORT INSTITUTE

MRIGlobal AR SWOV MIROS CHULA ENGINEERING Foundation toward Innovation

ASIA-PACIFIC ROAD SAFETY OBSERVATORY ADB THE WORLD BANK GRSF Global Road Safety Facility Bloomberg Philanthropies INITIATIVE FOR GLOBAL ROAD SAFETY iRAP GLOBAL ROAD SAFETY PARTNERSHIP

ThaiRAP Collaboration

ThaiRAP
THAI ROAD ASSESSMENT PROGRAMME

CHULA ENGINEERING
Foundation toward Innovation

MIROS
MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH
ASEAN ROAD SAFETY CENTRE

AIT
Asian Institute of Technology

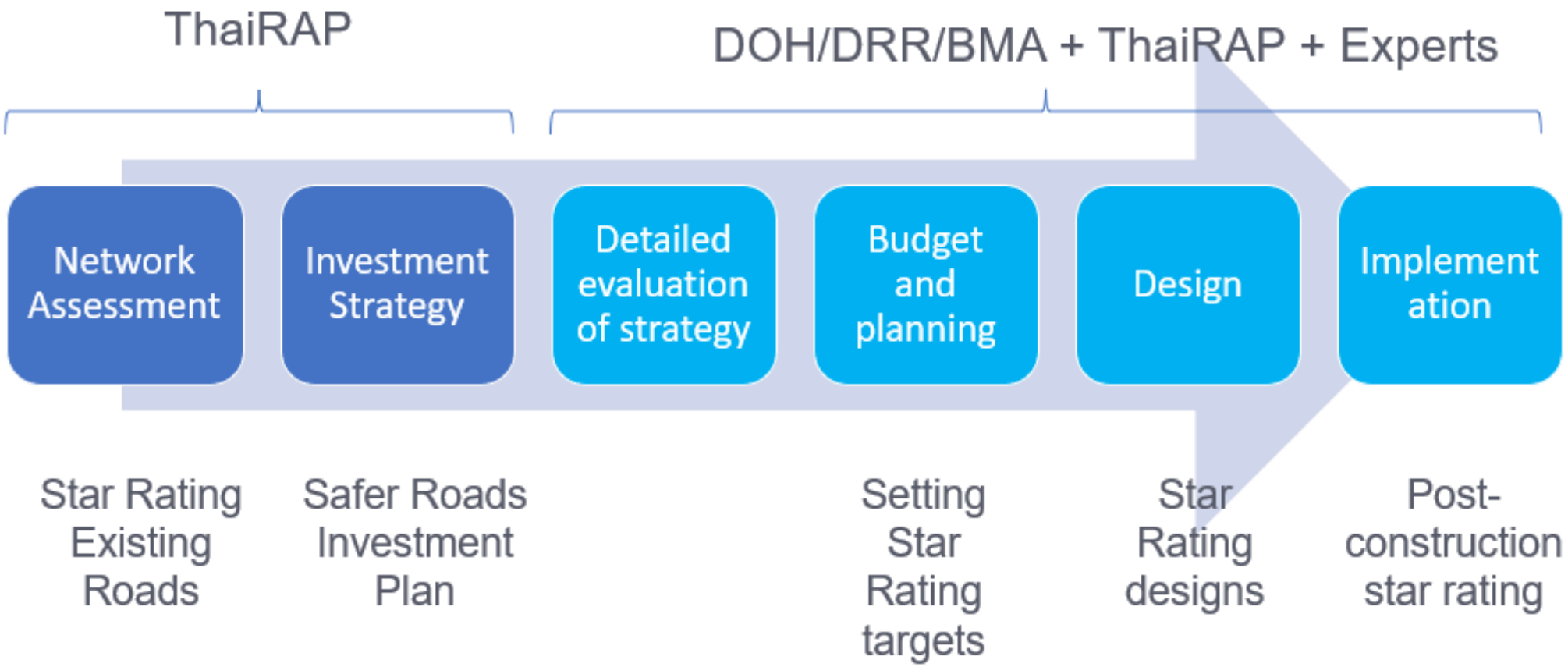
Bloomberg Philanthropies
INITIATIVE FOR GLOBAL ROAD SAFETY

iRAP

ChinaRAP
CHINA ROAD ASSESSMENT PROGRAM

IndiaRAP

Typical iRAP process / adapted for Thailand



Training and capacity building

Two day iRAP workshop on evidence-based road safety interventions and DRIVER at Chulalongkorn University

iRAP assessments in cities training

Star Ratings and Investment Plan Training in Bangkok

1st Workshop on iRAP Developments in Asian Countries

iRAP

MIROS
MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH
ASEAN ROAD SAFETY CENTRE

ChinaRAP
CHINA ROAD ASSESSMENT PROGRAM

IndiaRAP

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ThaiRAP / MIROS Collaboration

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ThaiRAP MyRAP

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Road Safety Education

ThaiRAPofficial

Light Star Ratings in Thailand

- Currently used by Department of Rural Roads (approx. 47,000 km)
- Based on a subset of road attributes used in the iRAP Star Rating methodology, drawn from the DRR road asset database
- Focus on vehicle occupants and motorcyclists

Road Safety Audit System (RSAS)

- An on-line decision-making tool designed to systematically conduct rural road safety improvement projects in Thailand

- RSAS helps:
  - Identify hazardous locations on rural road networks
  - Determine safety deficiencies on road sections
  - Recommend possible short-term and long-term treatments

2021 IRF Global Achievement Award

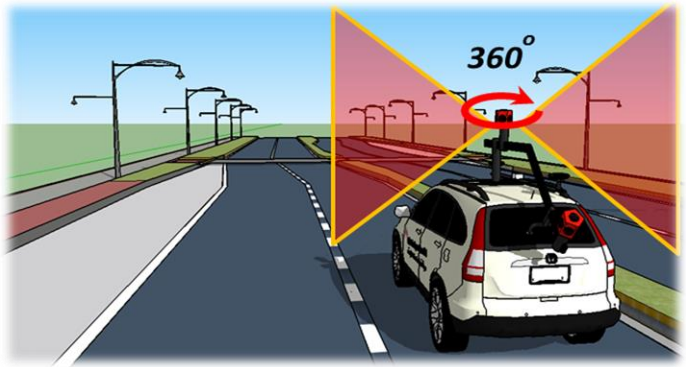
Road attribute data collection

GNSS with Dual Antenna

2 x Computer (Image and Positi

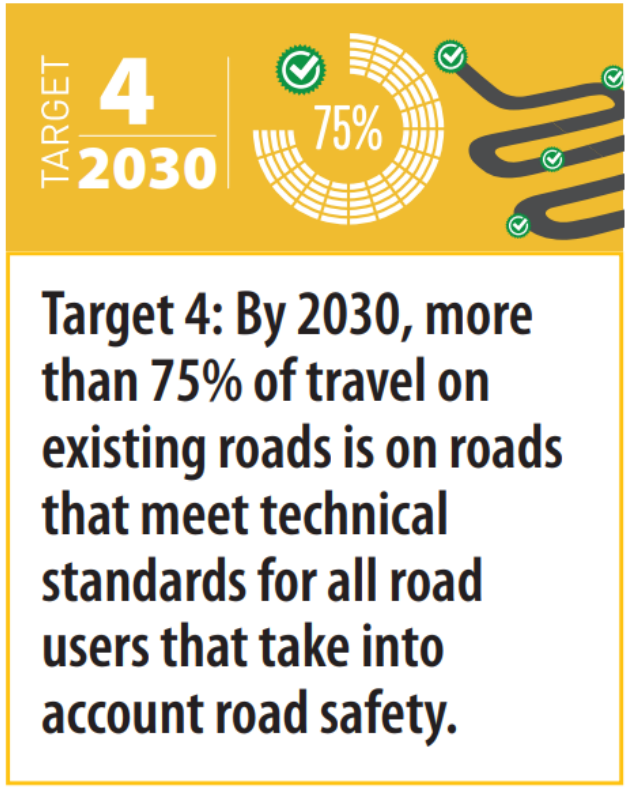
Ladybug3 Camera

meter and Compass



Safety Assessment Module

Towards Global Road Safety Targets



- Need to establish baseline data to enhance measurement of current level of road safety for Thai roads
- Due to the lack of traffic data, the amount of travel in terms of vehicle-km of travel cannot be easily estimated. The baseline data is currently unknown, and it is unclear where the 75% of the travel is.

Big Data Integration

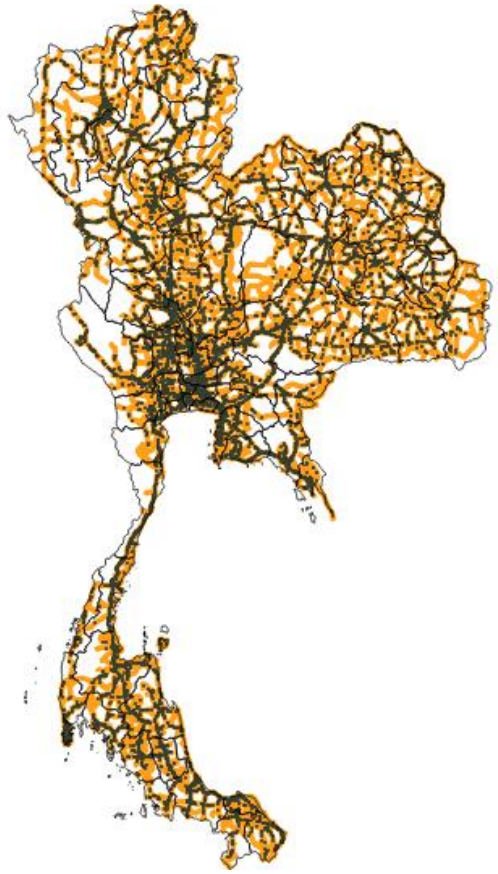
Road Network and Inventory data

ROADNET
Central Road Database
ระบบสารสนเทศโครงข่ายทางหลวง

CRD
ระบบบริหารฐานข้อมูลกลาง กรมทางหลวงชนบท
Central Road Database Management System

EXAT
การทางพิเศษแห่งประเทศไทย
EXPRESSWAY AUTHORITY OF THAILAND

OpenStreetMap



Crash data

กระทรวงคมนาคม

ThaiRSC
ศูนย์ข้อมูลอุบัติเหตุ เพื่อเสริมสร้างวัฒนธรรมความปลอดภัยทางถนน

Traffic data

TOMTOM

ASIA-PACIFIC ROAD SAFETY OBSERVATORY
ADB
THE WORLD BANK
GRSF Global Road Safety Facility
Bloomberg Philanthropies INITIATIVE FOR GLOBAL ROAD SAFETY
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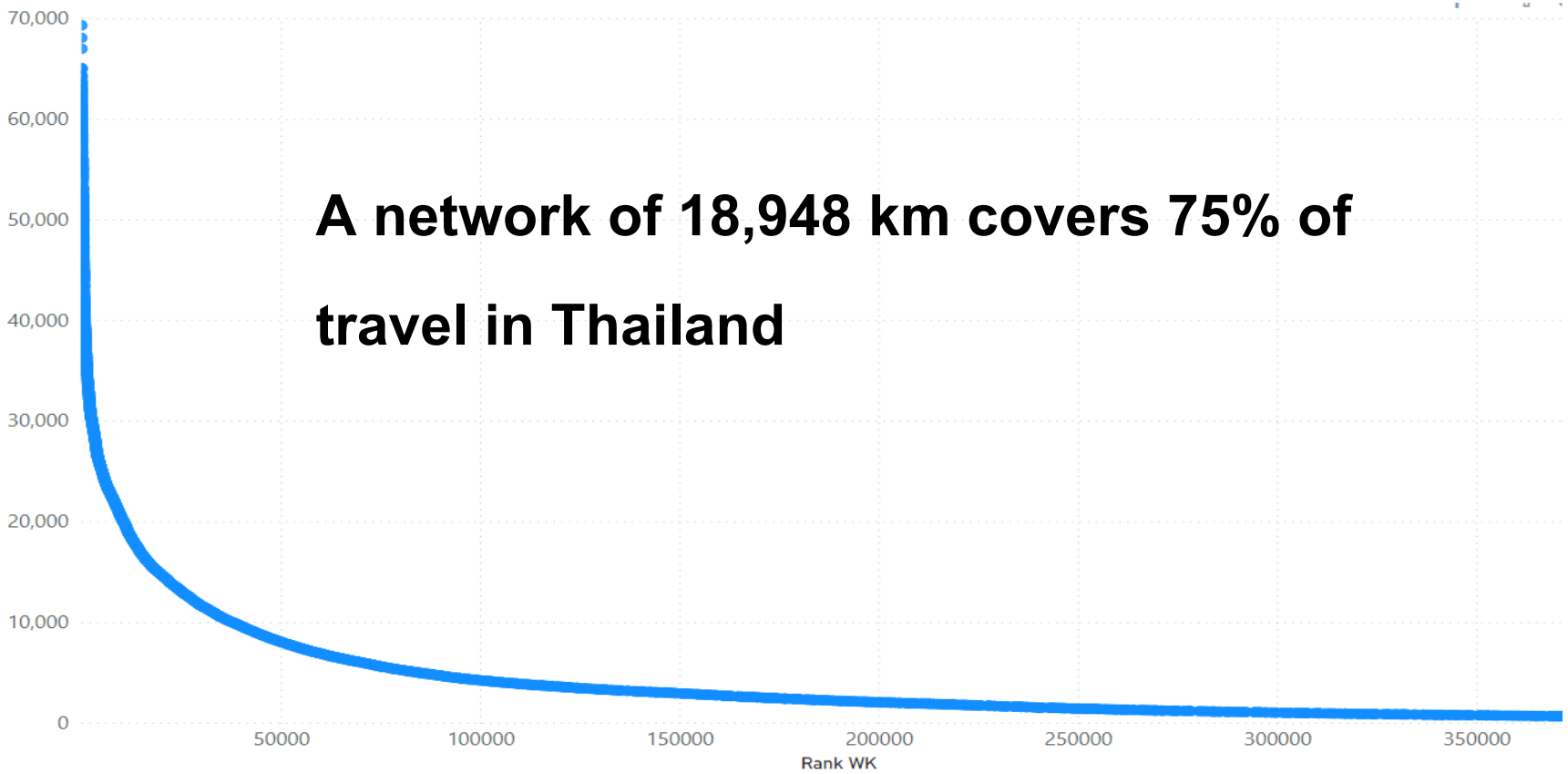
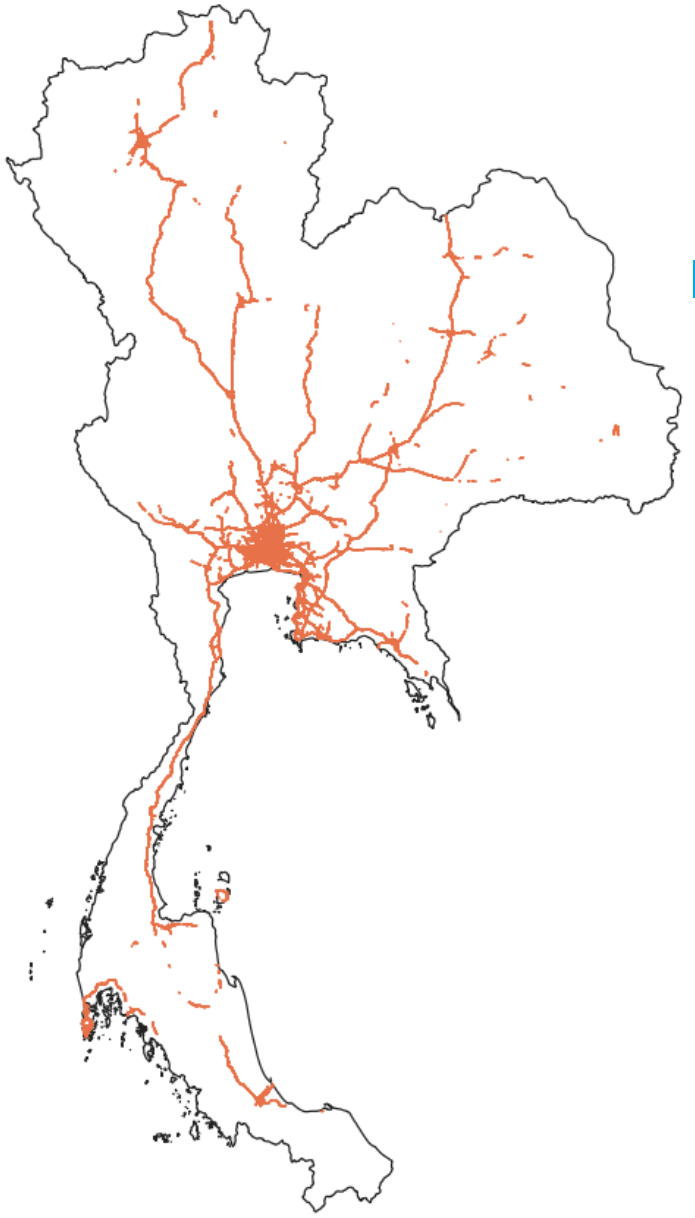
75% of travel on Thai roads



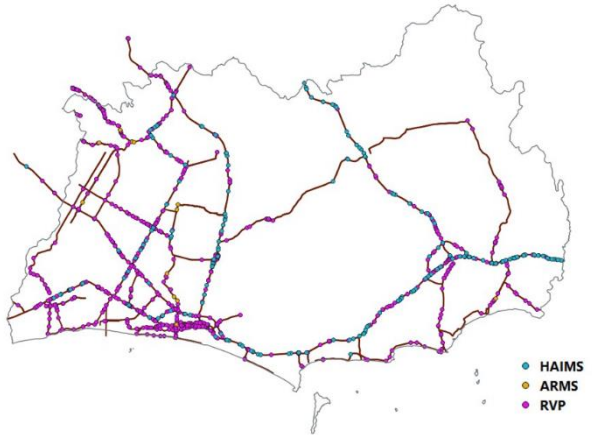
A network of 18,948 km covers 75% of travel in Thailand



75% Travel: Rayong province

Total road network
9,429 km

75% Travel



Risk map

Focusing on 770 km (8.2%) out of a total of 9,429 km in the province

Road agency	VKT (million/yr)	Length (km)	% within province	% within road agency
Department of Highways (DOH)	2.0928	413	4.4	95
Department of Rural Roads (DRR)	0.1614	138	1.5	24
Local Roads	0.3704	219	2.3	3
Total	2.6246	770	8.2	-

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DECADE OF ACTION

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