COMPENDIUM OF
10th ATRANS (Symposium) Annual Conference

"Transportation for A Better Life: Mobility and Road Safety Managements"

18 August 2017

Bangkok

Asian Transportation Research Society (ATRANS)

Program of 10th ATRANS Annual Conference on Transportation for a Better Life: Mobility and Road Safety Managements

18 - 19 August 2017, 09:00 – 18:00 at Grand Ball Room, 4th Floor, Radisson Blu Plaza Hotel, Sukhumvit Road, Bangkok, Thailand

Day 1: 18 August	Main Conference Day					
08:00 09:00	09:00 – 09:10		09:10 – 09:15		09:15 – 09::35	
Registration	Opening Session at Grand Ball Room, 4th Floor Hosted by Dr. Tuenjai Fukuda, ATRANS Secretary – General and Dr. Nuwong Chollacoop, Vice-Chair of Research Committee					
	Introductory Remarks **Mr. Chamroon TANGPAISALKIT** ATRANS Chairperson, Thailand		Welcome Remarks **Prof. Dr. Kazuhiko TAKEUCHI** President of International Association of Traffic and Safety Sciences (IATSS), Japan		Opening Remarks **His Excellency, Mr. Arkhom TERMPITTAYAPAISITH** **Minister of Transport, Thailand**	
09:35 – 09:55	**Coffee break and See exhibition and poster sessions**					
09:55 – 10:15	Keynote lecture by Prof. Dr. Kazuhiko TAKEUCHI					
Plenary Session	Moderator	Invited Speaker 1	Invited Speaker 2	Invited Speaker 3	Invited Speaker 4	Invited Speaker 5
Session 1: Panel Discussion on Mobility *& Road Safety Managements* *(10:15- 12:00)* **Room**: Grand Ball Room (*Each speaker has 10 minutes for presentation)*	Mr. Silpachai Jarukasemratana, Former Permanent Secretary of MOT, Thailand	(10:15-10:25) Mobility and Road Safety Managements in Australian Perspective By **Dr. Lori MOOREN** Transport and Road Safety Research, The University of New South Wales, Australia	(10:35-10:45) Road Safety Management in Japan By **Mr. Yasushi NISHIDA** Institute for Traffic Accident Research and Data Analysis, Japan	(10:45-10:55) Mobility and Road Safety Managements in China By **Prof. Dr. Shengchuan ZHAO**, Dean of School of Transportation and Logistics, Dalian Univ., of Technology, China	(10:55-11:05) Accident and Road Safety Management in India By **Asst.Prof.Dr. Digvijay S. PAWAR** Dept. of Civil Engineering, India Institute of Technology, Hyderabad, India	(11:05-11:15) Accident and Road Safety Managements in Thailand By **Prof.Dr. Pichai TANEERANANON** Prince of Songkla University, Thailand
30 minutes for panel discussion		(11:15-12:00) Panel Discussion				
12:00 – 13:00	Luncheon provided at 27 Bites on 2nd Floor					
Parallel Session*: 2A Transport Safety* *(13:10 - 15:10)* **Room**: Grand Ballroom A, 4th Floor (*Each speaker has 15 minutes for presentation)*	Prof.Dr. Atsushi Fukuda, Nihon University, Japan	(13:10-13:25) V2X Development for Road Safety in Japan and Its Trial for V2M in Taiwan By **Dr.Yoshiharu DOI and Dr. Chang-Yi LUO**, Toyota InfoTechnology Center Co., Ltd., Japan	(13:25-13:45) Road Accidents and Awareness raising through Public Participatory Approach in Japan By **Prof. Dr. Satoru KOBAYAKAWA** Dept. of Transportation Systems Engineering, Nihon University, Japan	(13:45-14:00) Policy Implication and Practical Approach of Road Safety in Thailand By **Dr. Witaya CHADBUNCHACHAI** Director, WHO Collaborating Center, Khon Kaen Hospital, Thailand	(14:00-14:15) Thailand Road Safety Master Plan and Safe System Approach By **Assoc.Prof.Dr. Pongrid KLUNGBOONKRONG** Deputy Director of Sustainable Infrastructure Research and Development Center (SIRDC), Khon Kaen University, Thailand	(14:15-14:30) Management of Road Safety on National Highways By **Mr. Sujin MUNGNIMIT** **Director of Highways Safety Bureau, Department of Highways, Ministry of Transport, Thailand**
40 minutes for discussion, Q&A		(14:30-15:10) Discussion, Questions and Answer				
15:10 – 15:30	**Coffee break and See exhibition and poster sessions**					

Continued Program of 10th ATRANS Annual Conference on Transportation for a Better Life: Mobility and Road Safety Managements

Parallel Sessions	Moderator	Invited Speaker 1	Invited Speaker 2	Invited Speaker 3	Invited Speaker 4	Invited Speaker 5
Session: 3A ***Smart Mobility*** *(Transport infrastructure and Transit Oriented Development- TOD)* *(15:30 - 17:30)* **Room:** Grand Ballroom A, 4th Floor *(Each speaker has 15 minutes for presentation)*	**Prof. Dr. Agachai Sumalee** Hong Kong Polytechnic University, Hong Kong	(15:30 – 15:45) Hybrid Land Use for the Urban Expressway Development By **Mr. Kenji OGURA** Senior Director, Hanshin Expressway Co.,Ltd., Japan	(15:45 – 16:00) Research & Development for Smart Mobility in Hong Kong By **Prof.Dr William H.K. Lam** Hong Kong Polytechnic University, Hong Kong	(16:00 – 16:15) **Transport infrastructure and Regional Development for Smart Mobility: From the HSR Experience of Japan** By **Mr. Hirouki MIZUI** JICA Expert for High Speed Rail Study Project, Thailand	(16:15 – 16:30) **Walkable Environment for Smart Mobility and Transit Oriented Development- TOD** By **Prof.Dr. Atsushi FUKUDA** Nihon University, Japan	(16:30 – 16:45) **Ride – Sharing for Smart Mobility** By **Dr. Sumet Ongkittikul** Thailand Development Research Institute (TDRI) Foundation, Thailand
45 minutes for Q&A		(16:45-17:30) Discussion, Questions and Answers				
Session 3B: ***Logistics & Disaster Management*** *(15:30 - 17:30)* **Room:** Grand Ballroom B, 4th Floor *(Each speaker has 15 minutes for presentation)*	**Dr. Siradol Siridhara** Mahidol University, Thailand	(15:30 – 15:45) Eco-Navigation Planning System for Domestic Vessel "ECoRo" By **Ms. Yoshiko SATO** Engineer of Disaster Mitigation Solutions Department, Japan Weather Association, Japan	(15:45 – 16:00) Truck Operating Cost in Thailand By **Asst. Prof. Dr. Varameth Vichiensan** Kasetsart University, Thailand	(16:00 – 16:15) Disaster Management in Thailand By **Col.Dr. Thai Charnkol** Engineering Battalion Commander, Royal Thai Army, Thailand	(16:15-16:30) Disaster Preparedness and Response in the Philippines: The Case of Earthquakes By **Prof.Dr. Alexis M. Fillone** President of Transportation Science Society of the Philippines	(16:30 – 16:45) How to Distribute Relief Goods at the Large-scale Earthquake: Learning from Japan Earthquake in 2011-2016 **Prof. Dr. Satoru KOBAYAKAWA** Dept. of Transportation Systems Engineering, Nihon University, Japan
45 minutes for discussion, Q&A		(16:45-17:30) Discussion, Questions and Answers				
Session 3C: ***Transportation-related, Energy and Environment*** *(15:30 - 17:30)* **Room**: Suite 1-2, 3rd Floor *(Each speaker has 20 minutes for presentation)*	**Dr. Nuwong Chollacoop** MTEC, Ministry of Science and Technology, Thailand	(15:30 – 15:50) Financing Sustainable Urban Transport By **Mr. Frederik Strompen** Advisor, Transport and Climate Change, GIZ	(15:50 – 16:10) Impact Assessment of a Wildlife Corridor on a Human Populated Area By **Dr. Win TRIVITAYANURAK** Department of Highway, Ministry of Transport, Thailand	(16:10 – 16:30) ASEAN Fuel Economy Platform By **Mr. Tali Trigg** Project Director of Energy Efficiency and Climate Change Mitigation in the Land Transport Sector in the ASEAN Region, GIZ	(16:30-16:50) Electric Vehicle Charging Station Promotion in Thailand By **Asst. Prof. Dr. Amornrat Kaewpradap**, Department of Mechanical Engineering, Faculty of Engineering, King Mongkut's University of Technology Thonburi (KMUTT), Thailand	
40 minutes for Q&A		(16:50-17:30) Discussion, Questions and Answers				

Remarks: (1) Information of AYRF 2017 Sessions 2B, 2C and 2D are provided in separate program.
(2) Exhibition and Poster Sessions together with morning and afternoon Coffee Breaks are provided during 09:40 – 10:00 and 15:10 – 15:30.

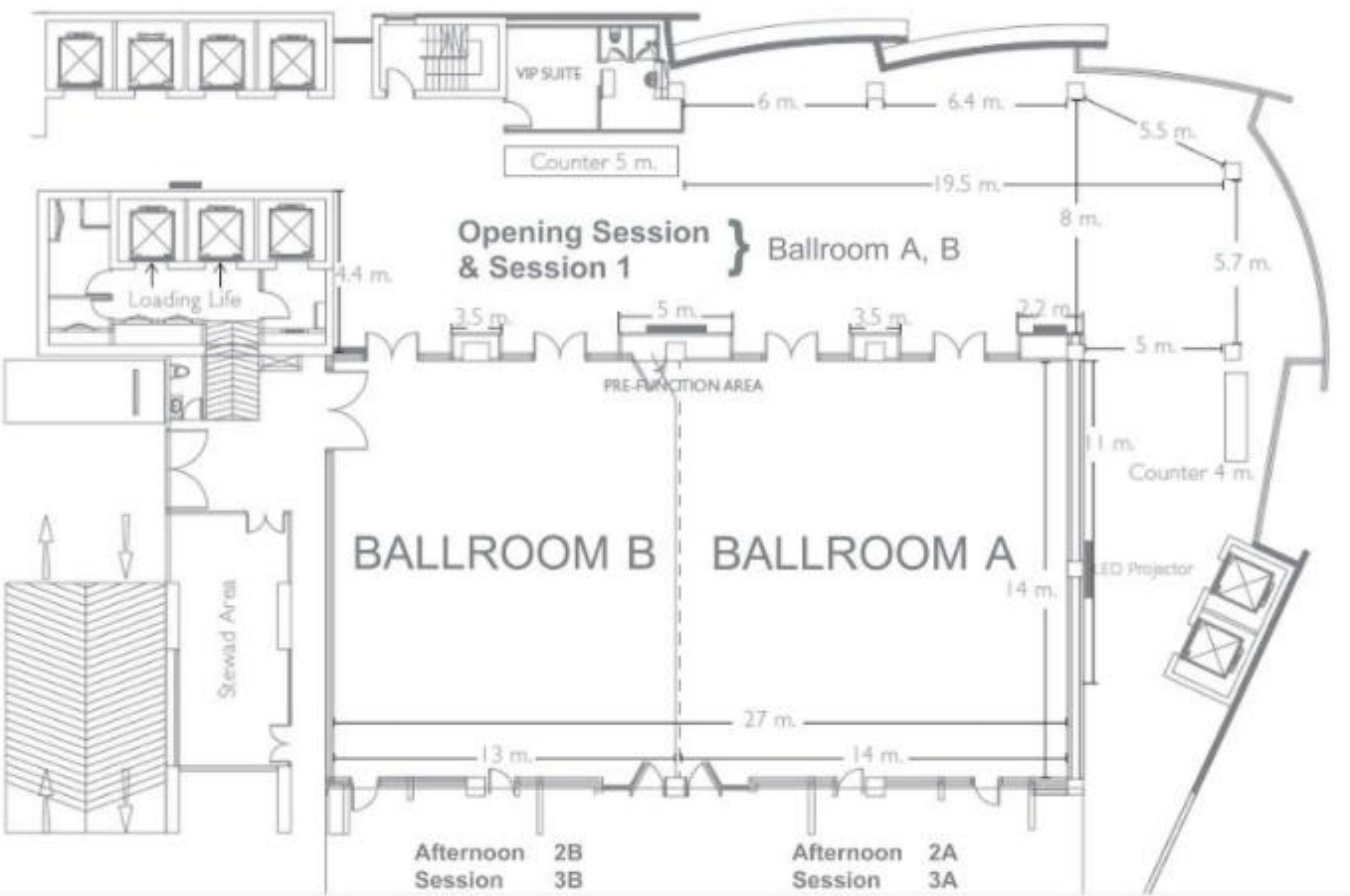
Continued Program of 10th ATRANS Annual Conference on Transportation for a Better Life: Mobility and Road Safety Managements

Parallel Session	Moderator	Invited Speaker 1	Invited Speaker 2	Invited Speaker 3	Invited Speaker 4
Session 3D: *Intelligent Transportation System (ITS)* (15:30-17:30) Room: The Gallery, 3rd Floor *(Each speaker has 20 minutes for presentation)*	Assoc.Prof.Dr. Sorawit Narupiti Chulalongkorn University, Thailand	(15:30-15:50) Intelligent Use of Probe Data in Map Making By **Mrs. Leen D'hondt** **Mr. Akavudth PHOLPERM** Tom Tom, Smart City and Traffic Info	(15:50-16:10) Video Analytics for Intelligent Transportation Systems By Dr. Matthew N. Dailey Asian Institute of Technology (AIT), Thailand	(16:10-16:30) Next Generation of Global Navigation Satellite System (GNSS) and its Application in ITS By **Dr. Monsak Socharoentum** NECTEC, Ministry of Science and Technology, Thailand	(16:30-16:50) ATRANS SAFETY MAP: Mobile Application for Mapping Black Spot Locations By Asst.Prof.Dr. Paramet LUATHEP Prince of Songkla University, Thailand
40 minutes for Q&A	(16:50-17:30) Discussion, Questions and Answers				
17:30 – 18:00	Presents Certification to AYRF Presenters	**Presents Best Paper & Presentation Awards**	**Presents Certification to AYRF 2017 Committee**	**Closing Remark**	
19:00 – 21:30	**Reception at ESC Bar by the pool, the Radisson Blu Plaza Hotel (By Invitation only)**				

Remarks: (1) Information of AYRF 2017 Sessions 2B, 2C and 2D are provided in separate program.
(2) Exhibition and Poster Sessions together with morning and afternoon Coffee Breaks are provided during 09:40 – 10:00 and 15:10 – 15:30.

Day 2, 19 August 2017	***Technical Visit*** **- Air Traffic Control Tower, Suvarnabhum Airport**	
Duration	**Program**	**Remarks**
7:45 – 8:00	Gathering at Radisson Blu Plaza Hotel	**The technical visit under patronage of MOT** can accept only 45 persons. To reserve your seat, early registration is required.
8:00-9:45	Departure from Hotel by Buses and arrival at Suvarnbhumi Airport	
9:45-10:00	Arrival at Air Traffic Control Tower and have a Short break	2 buses are provided **by AP HONDA.**
10:00 – 11:30	Visit Air Traffic Control Tower and Listen to presentation & See practical operation	**Air traffic Control Officials will provide and intro presentation and explanation in English only.**
11:30 - 11:45	Conclusion of technical visit & Group Photo Taken	Light meal and soft drinks are provided on board.
11:45 – 13:45	Leave Air Traffic Control and back to Hotel by buses	

Main Conference Floor located on 4th Floor



Parellel Sessions of 2C, 2D, 3C and 3D located on 3rd Floor

<Morning Session>

< OPENING SESSION >

Opening Session (09.00-09.40) Grand Ball Room
Introductory Remarks Mr. Chamroon TANGPAISALKIT, ATRANS Chairperson
Welcome Remarks Prof. Dr. Kazuhiko TAKEUCHI, President of International Association of Traffic and Safety Sciences (IATSS)
Opening Remarks His Excellency, Mr. Arkhom TERMPITTAYAPAISITH, Minister of Transport, Thailand

Introductory Remarks

By Mr. Chamroon TANPAISALKIT, ATRANS Chairperson

Good morning, a very warm welcome to all of you to the tenth (10th) ATRANS Annual Conference:

- His Excellency, Arkhom Termpittayapaisith, Minister of Transport, Thailand;
- Prof. Dr. Kazuhiko TAKEUCHI, President of International Association of Traffic and Safety Sciences (IATSS), Japan;
- Mr. Hiroyuki KANEKO, Managing Director of IATSS, Japan;
- Mr. Silpachai Jarukasemratana, ATRANS Honorable Advisor and Former Permanent Secretary of Ministry of Transport;
- Prof. Dr. Atsushi Fukuda, ATRANS Honorable Advisor, Japan;
- Dr. Witaya Chadbunchachai, Director of WHO Collaborating Center;
- Prof.Dr. Pichai Taneerananon, President of Thai Society for Transportation and Traffic Studies;
- Distinguished Guest Speakers from Australia, China, GIZ, Japan, the Netherlands, Philippines, Thailand, Turkey and Vietnam;

As well as Delegates and ATRANS Committee Members, Ladies and gentlemen, we, at ATRANS, are delighted to host this gathering today.

Let me briefly look back at the history of ATRANS activities:

On forth (4th) of May 2007, a group of keen academics, researchers and Transport Practitioners joined hands to discuss seriously in forming a non-profitable and pure academic research activity benefiting society at large, which has become ATRANS Society nowadays.

This year, ATRANS has entered the tenth (10th) years of operation since its establishment in 2007. ATRANS Committee decided to change the name of event from "ATRANS Symposium" to a more common assemble name as "ATRANS Annual Conference" and to celebrate our 10th year anniversary.

Our vision is to pursue "Transportation for a Better Life." One of ATRANS missions is to turn research outcomes to actual implementation in the community.

In response to the needs of young researchers, we initiated ATRANS Young Researcher's Forum to provide a broader opportunity to not only young researchers but also students at large to present their research outputs and to share their knowledge and ideas with one another.

Continued on next page:-

His Excellency Arkhom, Distinguished guests, ladies and gentlemen:

The Purpose of today's conference is to discuss the issues that we are most concerned in mobility and management of road safety.

We may agree that Information and Communications Technology play a very vital role in assisted mobilizing people better and smarter. We may also agree that Management of Mobility is a tool to achieve sustainable city development and provide competitiveness in transport sector.

Road accidents have emerged as a significant cause of deaths and injuries for decades. With extremely high casualties and property damages, road crashes have tremendous impacts on human life and national economy. This is therefore, the main theme of our 10th ATRANS Annual Conference is “Transportation for a Better Life focuses the issues on Mobility and Road Safety Managements.”

The Mobility and Safe System Approach for Road Safety Management, together with Transport Infrastructure like Rail System and Transit Oriented Development, Logistics and Disaster Management on flooding and earthquakes have recently drawn a lot of attention in Asia and here in Thailand and beyond.

The sustainable transport like “electric vehicle,” the use of energy, and impact assessment of wildlife corridor against transport development as well as ITS technology for Next Generation of Global Navigation Satellite System and ATRANS Safety Map Application have also been discussed a great deal these days. I hope you will all join in the discussion today, making it fruitful and beneficial for everyone.

Distinguished guests, delegates, ladies and gentlemen:

Our members and staffs here have worked enthusiastically and relentlessly in preparing and making this annual conference happened. We wish to ensure that all of the distinguished participants gain many and diverse ideas related to transportation. We hope you may use this opportunity for network building and as a cross-cultural exchange with one another.

ATRANS will always step forward little by little to contribute to our dynamic society through accumulating research and knowledge on transportation, traffic safety, energy and environment and through providing opportunities to share the outcomes with all of you.

And Last but not least, ATRANS is greatly in debt of International Association of Traffic and Safety Sciences or IATSS for funding ATRANS activity. Without their consecutive contribution, ATRANS would not have come to this far. At this time, ATRANS is honored to invite Prof. Kazuhiko TAKEUCHI, the President of IATSS, who is so kindly shared his precious time to come to Thailand to celebrate ATRANS 10th years of operation and to address our assembled delegates and guests the welcome remarks and the introduction of IATSS.

Prof. Dr. Takeuchi, please.

END

Welcome remarks

By Prof.Dr. Kazuhiko TAKEUCHI, President
International Association of Traffic and Safety Sciences (IATSS), Japan

Good morning, it has been such a privilege and honor to welcome you to the tenth (10^{th}) ATRANS Annual Conference:

- His Excellency, Arkhom Termpittayapaisith, Minister of Transport, Thailand;
- Mr. Silpachai Jarukasemratana, ATRANS Honorable Advisor and Former Permanent Secretary of Ministry of Transport;
- Mr. Chamrron Tangpaisalkit, ATRANS Chairperson;
- Distinguished Guest Speakers from Australia, China, GIZ, Japan, the Netherlands, Philippines, Thailand, Turkey and Vietnam

As well as Delegates and ATRANS Committee Members, Ladies and gentlemen.

My name is Kazuhiko Takeuchi, President of International Association of Traffic and Safety Science, so called IATSS in short. I am very happy to be here at this gathering today.

Please allow me to say some brief words on behalf of IATSS.

IATSS was established in 1974 by Mr. Soichiro Honda and Mr. Takeo Fujisawa, co-founders of Honda, and we just celebrated its 40^{th} anniversary last year in September.

IATSS is now off and running for the next ten years.

While maintaining our ultimate goal of bringing about an ideal mobility society, we have also begun setting objectives for contributing globally over the next ten years.

To this end, we will be establishing a new forum for knowledge activities such as discussing new strategic approaches and transportation globally.

Looking at overarching trends, while Europe, North America, and Japan have mature transportation environments, it is incredibly important to reduce and prevent traffic accidents, and to work to address environmental issues, in areas of Asia where traffic accidents are increasing as motorization expands.

ATRANS is now marking the 10^{th} edition of this annual conference, and the efforts made and knowledge accumulated is evident. I look forward to working together to apply such efforts and knowledge to the real world, sharing the experience of mature countries and making proposals that reflect it as we contribute together to bringing about a better mobility society.

Continued from previous page:-

I look forward to your innovative ideas and continued ability to get things done.

I look forward, too, to an energetic exchange of views today.

Thank you very much.

END

What is IATSS & IATSS Forum

18 08 2017
President of IATSS
Prof.Dr.Kazuhiko Takeuchi

Public Interest Incorporated Foundation
International Association of Traffic and Safety Sciences

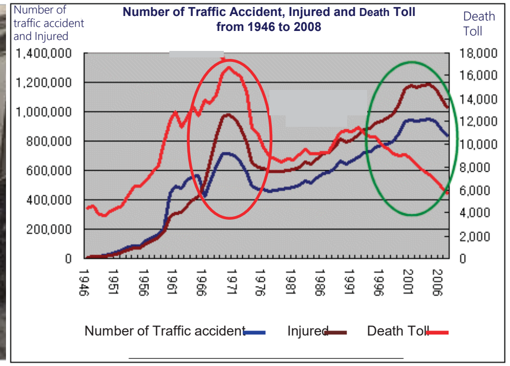
Establishment of IATSS

Established in 1974

●Background
Traffic accidents & safety issue, problem of automobile emissions, and energy problem hit by the "oil shock" crises

●The International Association of Traffic and Safety Sciences (IATSS) was formally established on **Sept. 17, 1974,** courtesy of an endowment from **Soichiro Honda** and **Takeo Fujisawa**, founders of Honda Motors Co., as well as Honda Motors itself.

In the 60s, Tokyo



Organization of IATSS

Counsellors

Board of Councilors

Board of Directors

Auditors

Planning and Coordination Committee

Strategic Conference

by Representative of Directors and Coordination Committee Members

<GIFTS>
Committee of Global Interactive Forum on Traffic and Safety

President
Kazuhiko Takeuchi

Special Committee

(1)
Research Dept.

・Research is a core activity for IATSS
・The results of these activities are presented at the Annual Research Report Conference and compiled into research Report

(2)
Publicity & Publication Dept.

・Publish academic journals and collection of papers on transportation issue
-IATSS RESEARCH (for over seas)
-IATSS Review (Domestic)

(3)
Awards & Grants Dept.

・The IATSS Award (3 category)
-The Achievement Award
-The Literature Award
-The Dissertation Award

(4)
IATSS Forum

・Bringing up of leader for next generation in ASEAN countries.

Fiscal 2016 Activities : Research projects

	No.	Theme of research project	PL
1	1601A	Strategic project celebrating 50 years since founding: International comparison: Setting goals for road traffic safety and traffic awareness - Research on international comparisons related to road traffic safety technology, systems and awareness -	Hideki Nakamura
2	1602A	Support for implementation of information-sharing traffic safety scheme in Malaysia	Hirokazu Akahane
3	1603A	Survey on introducing ITS in Asia and research on formulating guidelines	Shunsuke Kamijo
4	1604B	Empirical research on improving traffic safety in Phnom Penh, Cambodia - Perspectives on non-structural aspects among young people	Yuto Kitamura
5	1605B	School Route Vision Zero: Aiming for zero accidental deaths of children	Hisashi Kubota
6	1606B	Analysis of perception and action characteristics of elderly people related to mistaking accelerator and brakes	Kazumitsu Shinohara
7	1607B	Research on effective transportation regulation plans	Akinori Morimoto
8	1608A	Proposal to improve medical control based on probe data on ambulances	Takashi Moriya
9	1609B	Research on the development of bicycle traffic mobility and safety education programs for children and expansion to include disabled children	Nagahiro Yoshida
10	1610C	Collaborative government administration and organization theme: Academic research on tolerance for autonomous driving	Takeyoshi Imai
11	1611A	Collaborative government administration and organization theme: International comparison of transportation and safety awareness affecting driving behavior - Identifying risk of traffic accidents resulting from sharp rise in use of rental cars by tourists visiting Japan and recommended mitigation measures	Kenji Doi
12	1630	Overseas study: Planning and implementation status of transportation-related measures in foreign countries and related information studies	Nagahiro Yoshida
13	1670	International presentation: Research on Kagawa Prefecture - Recommendations on Measures for Analysis of Accident Causes -	Hirokazu Akahane

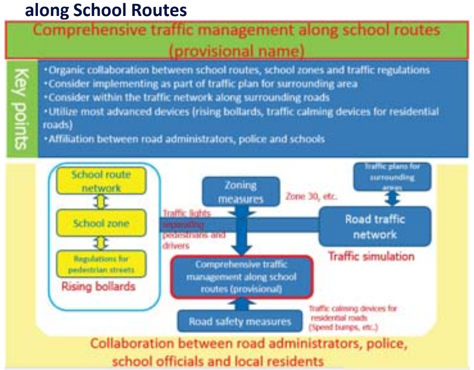
These research project theme have been chosen based on current Japanese traffic safety issue such as increasing fatality ratio of elderly people and accidents of children and cyclists also future issue such as autonomous driving.
Also as IATSS has a strong intention to contribute for under developing counties in terms of the reduction and the prevention for the number of accidents and fatalities, the number of research project for the Asian countries is increasing.

Fiscal 2016 Activities：1605BSchool Route Vision Zero: Aiming for zero accidental deaths of children

■Research objective■

In order to achieve school routes with zero deaths, which is the ultimate goal, comprehensive traffic management along school routes is proposed as a specific mechanism for comprehensive management along these routes, which had not necessarily been systematized.
Moreover, the effectiveness of new devices that have recently been made available for use is verified and used more broadly.

●Proposal for Comprehensive Traffic Management along School Routes



●Examples of workshops (Niigata: first workshop)

Participants including government administrators, school officials and residents were divided into groups made up of about 10 people each to discuss and summarize problems and issues along the school routes

Subsequently, the workshop met a total of three times to
・consider countermeasures,
・and decide on countermeasures
and then requested that the government formulate a response.

Based on the summary of issues prepared in fiscal 2015, guideline proposals were prepared and workshops were held locally in fiscal 2016 to give shape to comprehensive traffic management along school routes and test it out.
Finally, in fiscal 2017 the measures will be extended and proposals will be made.

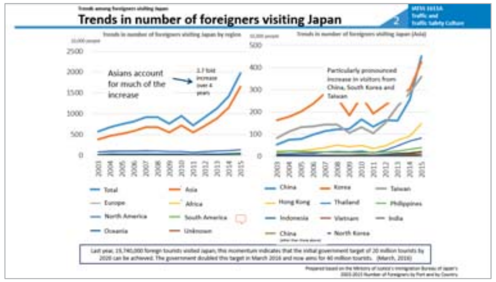
Fiscal 2016 Activities：1611A International comparison of transportation and safety awareness affecting driving behavior

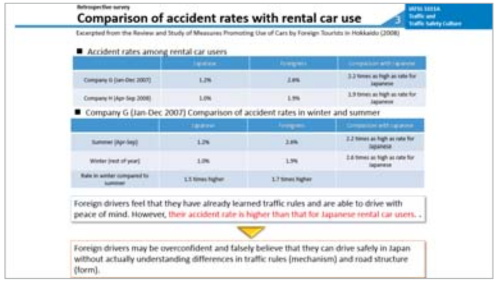
- Identifying risk of traffic accidents resulting from sharp rise in use of rental cars by tourists visiting Japan and recommended mitigation measures

■Research objective■

With the 2020 Tokyo Olympic and Paralympic Games just a few years away, there are concerns that an increase in the number of foreigners visiting Japan and driving rental cars will lead to more traffic violations and traffic accidents caused by foreigners, whose transportation and safety culture may differ from Japan in terms of driving habits and traffic regulations. This project utilizes the knowledge in the H2760 project and focuses on the driving habits formed on the back of social norms, legal systems and community environments. International comparisons are made between traffic and safety awareness and the impact this has on driving behavior, and measures to encourage safe driving by tourists in Japan are proposed.

●Current status of foreign visitors to Japan





In fiscal 2016, research will focus on Asia, and will be expanded to English-speaking regions for the two years from fiscal 2017 to prepare for the 2020 Tokyo Olympics.

The latest Business Activity：Publicity and Publications

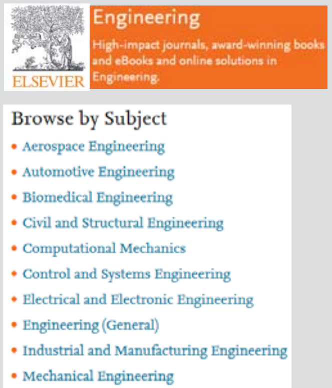
(2) Publicity and Publications

1) IATSS Review (A domestic academic journal)

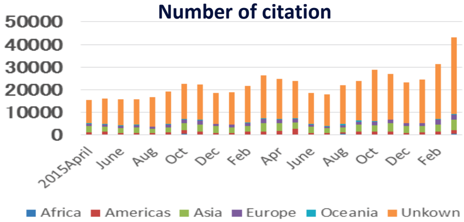
- Vol. 40,No.1「Traffic Accident & Forensic Medicine」
- Vol. 40,No.2「Automated Driving」
- Vol.40,No.3「Visual Information from Road Environment」

2) IATSS RESEARCH (Electronic Publishing from Elsevier)
An international academic journal for transportation and transport safety-related issues, is published electronically with open access twice a year in English by Elsevier Ltd.

- Vol. 39,Issue1「How Transport Statistics Contribute to Policymaking」
- Vol. 39,Issue2「Streets for Safe Communities: Integrated approach for Safe and Sustainable Transport」



Number of citation



The latest Business Activity：Awards and Grants

The IATSS Award for 3 Sections

The Achievement Award

The Achievement Award is given to organizations that have made outstanding contributions to transportation and transport safety.

◎Recipient：YAMATO Transport Co.,LTD & Northern Iwate Transportation Inc.
◎Achievements：Establish mixed distribution system for people and goods by a bus on a regular route.

◎Recipient： City of Kyoto
◎Achievement：Establish a idea of priority for human and public transportation system to make city planning

The Dissertation Award

The Dissertation Award is presented to people who have contributed outstanding papers to IATSS Review or IATSS Research.

◎Recipient ：
Höskuldur R.G. Kröyer
(Department of Technology and Society, Lund University)

◎Dissertation
Is 30 km/h a 'safe' speed?
Injury severity of pedestrians struck by a vehicle and the relation to travel speed and age
(IATSS Research 39-1)

The Literature Award

The Literature Award is given to people who have written outstanding documents or books on transportation

◎ Recipient ： Hiroyuki Nakano
「Global Strategy for Transportation infrastructure management」

◎ Recipient ： Tatsuzo Akase
「Signology for Public Spaces」

The Commissioner General of the National Police Agency

The Councillor, Secretariat of the Cabinet Office

Organization of IATSS

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Kazuhiko Takeuchi

Strategic Conference

by Representative of Directors and Coordination Committee Members

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Committee of Global Interactive Forum on Traffic and Safety

Planning and Coordination Committee

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(2) Publicity & Publication Dept.

- Publish academic journals and collection of papers on transportation issue
  - IATSS RESEARCH (for over seas)
  - IATSS Review (Domestic)

(3) Awards & Grants Dept.

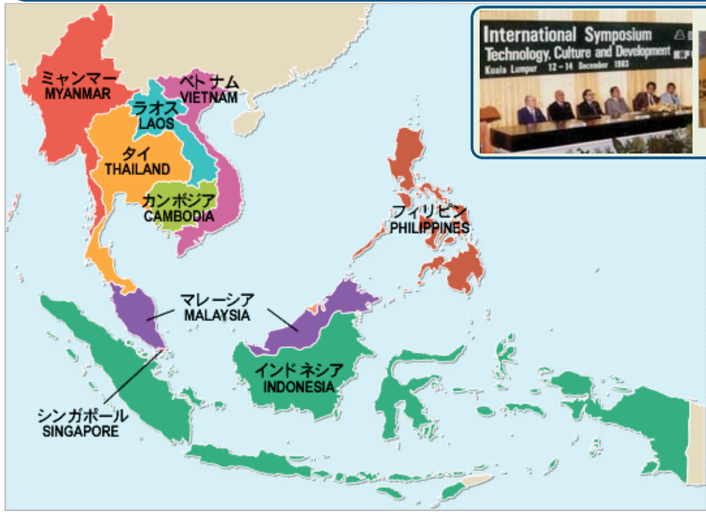
- The IATSS Award (3 category)
  - The Achievement Award
  - The Literature Award
  - The Dissertation Award

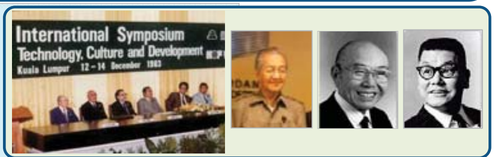
(4) IATSS Forum

- Bringing up of leader for next generation in ASEAN countries.

IATSS Forum Overview

While in Malaysia for the 1983 International Symposium, Soichiro Honda learned of then Prime Minister Mahathir bin Mohamad's theory that "the training of human resources would be the driver of future development in the ASEAN community." Enthusiastic about the idea, Honda responded by pledging his cooperation and launching operations.

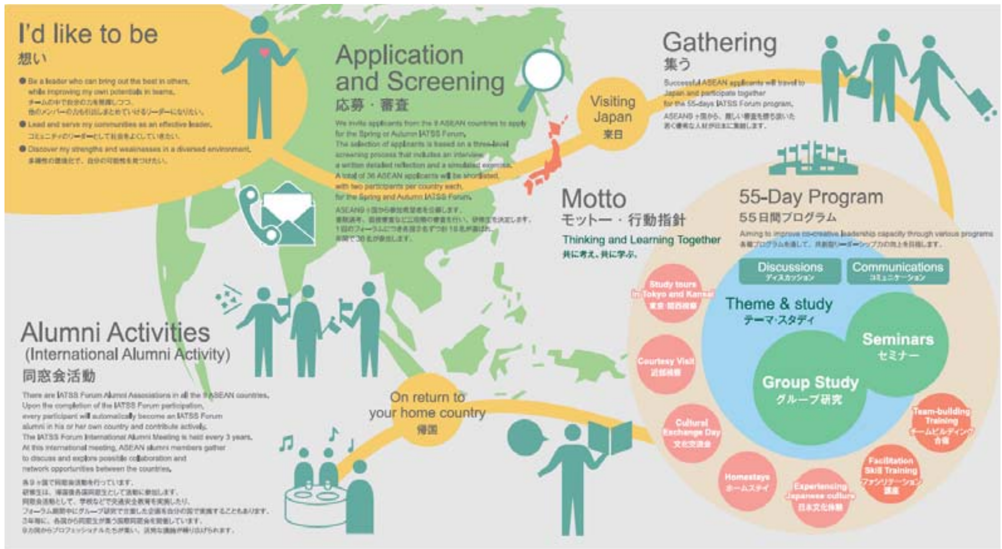




Malaysia	1985~	178
Indonesia	1986~	189
Thailand	1986~	215
Singapore	1988~	90
Philippines	1991~	97
Vietnam	1996~	64
Laos	1999~	59
Cambodia	2000~	54
Myanmar	2003~	48

Total 994 Participants (As of May. 2017)

Process for IATSS Forum Program



Participants pass screening process held in respective countries, and after the training they contribute to the development of their own country and region.

Training human resources who can help create a better society

Participants from nine southeast Asian countries are invited to participate in a 55-day leadership training program.

Program MAP

General studies

General seminar
- Revitalization of local industries
- Japan's modernization
- Politics
- Environment
- Cultural preservation
- Urban planning and transportation
- Leadership in Japanese companies
- Education

General observation
- Agricultural business
- Visits to small- and medium-sized companies
- Japan's pop culture
- Courtesy calls (Suzuka City Hall and embassies)
- Study tour to Kansai and Tokyo

Cultural exchange
- Introduction to Japanese culture
- Introduction to ASEAN culture
- Homestay
- Japanese language class

- Training camp -Team building-
- Facilitation skill training

Thematic studies

Creating sustainable

- Seminars on approach to creating sustainable communities
- Observation of models in Japan (Toba and Kobe)
- Group study: Participants work in groups to summarize their views on creating sustainable communities


Team building


General seminars


Field study


Group discussion


Group training


Group training presentation

Deliverables:
- Group report on creating sustainable communities
- Group presentation on creating sustainable communities

Building collaborative, co-creative leadership skills in diverse environments

IATSS Forum activities that turn ideas into reality

■Social contribution activities held by alumni associations in fiscal 2016

Cambodia
-environmental education-
Cooling Cambodia Project

Thailand
Cross-country leadership training event

Vietnam
Providing books and running libraries for children living in hospitals long term

Laos
Cultural preservation-
Cultural exchange event for ethnic minorities

Indonesia
-Leadership courses-
Team-building course

Leading social contribution activities in ASEAN countries

Opening Remark

By His Excellency, Minister Arkhom TERMPITTAYAPAISITH

Minister of Transport, Thailand

Good morning: I am very happy to be here today attending the 10th ATRANS Annual Conference on Transportation for a Better Life focuses the issue on Mobility and Road Safety Managements.

I would like to extend my warmest greetings and best wishes to

- Prof. Dr. Kazuhiko TAKEUCHI, President of International Association of Traffic and Safety Sciences (IATSS), Japan;
- Mr. Silpachai Jarukasemratana, ATRANS Honorable Advisor and Former Permanent Secretary of Ministry of Transport;
- Prof. Dr. Atsushi Fukuda, ATRANS Honorable Advisor, Japan;
- Mr. Chamroon Tangpaisalkit, ATRANS Chairperson;
- Dr. Witaya Chadbunchachai, Director of WHO Collaborating Center;
- JICA Representatives;
- Distinguished Guest Speakers from Australia, China, GIZ, Japan, the Netherlands, Philippines, Thailand, Turkey and Vietnam;

As well as Delegates and ATRANS Committee Members, Ladies and gentlemen.

It is undeniable that we are confronting with the fast-changing global economy, and the world is now moving fast towards digital era. Rapid urbanization becomes a global phenomenon. This has made transportation an inseparable part of our daily life. Cities and infrastructures will dominate majority of human development for the foreseeable future and sciences, technology and innovation (STI), including information and communication technologies (ICT).

Through these information and communication technologies, Prime Minister Operation Center can have data linkage with Ministry of Transport Operation Center make our communications easier and faster.

To make a global linkage, it is essential to organize this international gathering to exchange information and share experiences in transportation amongst countries across the continent. This will benefit to strengthen the cooperation and exploit transport infrastructure and urban developments for mobilization of people in safe, efficient, and friendly manners for the sake of our dynamic society.

Continued next page

To make a global linkage, it is essential to organize this international gathering to exchange information and share experiences in transportation amongst countries across the continent. This will benefit to strengthen the cooperation and exploit transport infrastructure and urban developments for mobilization of people in safe, efficient, and friendly manners for the sake of our dynamic society.

Delegates, Distinguished Guests, Ladies and Gentlemen:

Infrastructure is becoming more and more connected, intelligent and automated. Thailand's infrastructure still needs further development and improvement to boost the nation competitiveness. Hence, more investment will unavoidably be required.

To achieve that, Ministry of Transport has launched Thailand Transport Infrastructure Development and Strategic Plan for 2015 – 2022. This is a development framework of Thailand over the next 5 years to efficiently monitor the implementation of the projects. It aims to reduce cost of logistics and transportation, which in turn improve the competitiveness of the economy.

Those strategic plans included 1) Inter-City Rail Network Development; 2) Public Transportation Network Development Plan for Bangkok Metropolitan Region (BMR); 3) Capacity Enhancement for Highway Network to Link with Key Areas in the Country and with Neighboring Countries; 4) Maritime Transport Development by Increasing Water Transport Network; and 5) Capacity Enhancement of Air transport.

Under those 5 strategic plans, there are altogether 111 (one hundred and eleven) Projects worth 1,912 (one thousand-nine hundred and twelve) trillion Baht. Among those, there are ongoing processes such as Dual Track between Jira Junction and Khon Kaen Section; Feasibility Study of High Speed Rail; Motorway between Bang Pa In – Saraburi – Nakhon Ratchasima; Coastal port development (terminal A) at Laem Chabang Port; Single Rail Transfer Operator (SRTO) Phase 1 at Laem Chabang Port; and Suvarnabhumi Airport Phase II, these are just to name a few.

Regarding Thailand's support infrastructure for oversea project, the Cabinet resolution was taken place on 20 of May 2012 giving a support for Dawei Development Project in Myanmar linking Dawei with Eastern Seaboard.

Thailand's key activities to support regional integration and to manage mobility includes corridor network and regional supply chain as well as production base. Now, Bangkok travelers have more convenient access to mass transit, as purple line is now connected with Blue Line generating shorter distance and travel time to both Thonburi side and Nonthaburi side.

These are among other activities that we at Ministry of Transport are working to ensure that Thai people can connect from not only point A to point B but also any other destination across Thailand and neighboring countries.

Continued next page

Distinguished Guests, Ladies and Gentlemen:
Just in the past months, there has been high rainfall intensity which caused flood and flash floods in the northern and northeastern provinces of Thailand. These have significant impacts on logistics and disaster management, particularly road transportation network.

The local Department of Highways and Department of Rural Roads working closely together with the local Department of Disaster Prevention and Mitigation to repair some local roads so that the government can access and distribute food and survival bags to the villagers who got affected by the flood.

In addition, in coming October, Thailand prepares for farewell to our beloved King Bhumibol Adulyadej. Ministry of Transport is responsible for traffic management and hence some road sections will be closed in preparation and in duration of Royal Cremation Ceremony so as to be able to ensure at least there are sufficient spaces to accommodate a large number of people who come and pay respect for the passing of His Majesty, the King of Thailand.

Ladies and Gentlemen:

Another critical issue and I would say one of the most challenging tasks is road safety problem. Given Thailand's record on road safety, Thailand was ranked as the 2nd highest number of road accidents, injuries and fatalities for 2 (two) consecutive years according to World Health Organization (WHO).

The government realized the gravity of this manmade problem and has put together a 'Decade of Action' plan from 2011-2020 and a National Road Safety Program in place in its attempt to reduce road accidents during the period.

Just last year, Ministry of Transport established a Memorandum of Cooperation (MOC) on Road Safety in Thailand between Ministry of Transport and Ministry of Land, Infrastructure, Transport and Tourism or MLIT, Japan.

Under this MOC, there has been some important activities in exchanging knowledge and experiences between the 2 (two) ministries. The joint working groups between the 2 Ministries were formed. Some members are among MOT departments working closely together under One Transport concept.

There are 4 implemented project areas namely Supanburi, Uttaradit, Petchaboon and Khon Kaen Provinces. Based on MOC activity at the pilot areas together with road safety culture campaign activity, the number of accidents was decreased at some certain level.

And now the pilot project areas are expanded to Nonthaburi and Samutprakarn Provinces.

Continued next page

It was a compliment from MLIT saying that Thailand has a nice road infrastructure on national highways and rural highways. However, some road sections in the local areas are still lacking networks. Road accident statistics are unreliable making it difficult to prioritize where should be the area for in-depth accident analysis and for black spot treatment.

Road user behavior are the major key contributing factor to road accidents. Management of road safety will require the safe system approach.

To reduce road accidents in Thailand, a continuation and consistency of operation and a long-term plan must be co-existence. At the fourth (4) Working Group Meeting in June, MLIT recommended that MOT should conduct Road Safety Study with JICA technical assistance.

The Road Safety Study will include: 1) Developmental design and Integration of Traffic Accident Databases; 2) Capacity Improvement in Traffic Safety Engineering particularly for Accident Black Spots; 3) Capacity Improvement in Traffic Enforcement, Education, and Information Campaign to Implement the Comprehensive Traffic Safety Program; 4) Improvement of Rules and Regulations to Promote Sustainable Traffic Safety; and 5) Capacity Improvement in Functional Road Network Development.

Distinguished guest, ladies and gentlemen:

At the moment, MOT together with Department of Land Transport have made efforts to reduce number of road accidents. However, more is needed since drivers and road users are willing to take risks while participating in the road traffic.

Bridging the gap between the government and the public by utilizing technology is necessary. The Safety Map Application developed by ATRANS in cooperation with MOT will be used as one of the government platforms to connect people with MOT. People in the communities can locate the black spot and the near-miss incident in real time and report the information back to the MOT and local government. The app has been used in some part of Supanburi, Khon Kaen, Phuket and Songkla already.

I am certain that we will have more to discuss in the conference.

I hope you will all join in the discussion of the conference today make it successful event for all.

Now, it is time for me to declare the symposium opens.

Thank you very much.

จบคำกล่าว/END

< Keynote Lecture >

Keynote Lecture

By Prof. Dr. Kazuhiko TAKEUCHI,
President of International Association of Traffic and Safety Sciences (IATSS)

10th ATRANS Annual Conference

Global Sustainability and Sustainable Development Goals (SDGs)

Dr. Kazuhiko TAKEUCHI

Director and Project Professor, Integrated Research System for Sustainability Science (IR3S), The University of Tokyo

Chair of the Board of Directors, Institute for Global Environmental Strategies (IGES)

President, IATSS

18th August 2017, Bangkok, Thailand

Roots of "Sustainability"

(http://www.nih.gov/news/NIH-Record/10_20_98/story06.htm)

Sustainable Development

- "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED or Brundtland Commission)
- ambiguous definition (need to re-define "sustainability" predicated on a rigorous academic discipline)
- sometimes twisted for political purposes

The Progress and Development of Sustainability Science

- Systems perspective: links natural and social systems
- From complex thinking to transformational change
- Transdisciplinary focus, solution-oriented transformative research
- Co-design and co-creation of knowledge, promotes partnerships and collaborative action
- Need for education and capacity development for global sustainability

Sustainability Science Journal

UN Conferences on Sustainable Development and Implementing Sustainable Development

- 1972: United Nations Conference on the Human Environment (UNCHE) in Stockholm
- 1987: Our Common Future (Brundtland Report) "Sustainable Development"
- 1992:UN Conference on Environment and Development (UNCED) Rio Earth Summit; Rio Declaration, Agenda 21, GEF and UNCSD
- 2000: Millennium Summit (UN Millennium Declaration; Millennium Development Goals)
- 2002: World Summit on Sustainable Development (Rio+10) in Johannesburg
  - **Type II partnerships (2002)**
    "implementation of partnership initiatives voluntarily undertaken by some Governments, international organizations and major groups" (Final report: Environment and sustainable development: implementation of Agenda 21 and the Programme for the Further Implementation of Agenda 21; 12 Dec. 2002)
- 2012: Rio+20 (UNCSD): 'The Future We Want'
  - Establish the sustainable development goals (SDGs) (para 246)
  - These goals should address and incorporate **in a balanced way all three dimensions of sustainable development** and **their inter-linkages**.

- 2015, 25-27 September: UN Summit to adopt the 2030 Agenda for Sustainable Development ('Transforming Our World')

Evaluation of MDGs

Positive	Negative
Contents: ■ Improvement in poverty eradication, facilitate development assistance, multi-stakeholder participation（UNGA 2011a; UNDP 2011） **Goal setting:** ■ Create linkage between sectors（Vandermoortele 2011） ■ Clear and Comprehensive goal setting **Institutions:** ■ Result-base management **Finance:** ■ Increase ODA, prioritize poverty eradication in development policies（Moss 2010; Pollard et al. 2010; Manning 2010; Verdermoortele 2011）	■ Some MDGs are not expected to reach the goal (lack of concreteness and comprehensiveness) → enhance effectiveness ■ "One size fits all" nature of the goals → Gaps between countries and regions（Verdenmoortele 2011） ■ Lack of linkage between goals and lack of roadmaps after achieving the target

Partnership among Stakeholders on the Occasion of Rio+20

International Action for Realising a Sustainable Society

Earth Summit in Rio de Janeiro in 1992

The "Rio Declaration on Environment and Development" and "Agenda 21" were adopted for the establishment of a new worldwide partnership.
Member states started signing UNFCCC and UNCBD.

Johannesburg Summit in 2002

ESD got highlighted by Japan's proposal, with a decade of ESD following from 2004.

"Rio+20", the United Nations Conference on Sustainable Development (UNCSD), in 2012

RIO+20 United Nations Conference on Sustainable Development

The importance of a society with balance among the three aspects of environment, society, and economy was confirmed.
The outcome document "The Future We Want" was adopted and a process was launched to develop a set of **SDGs**.

Development of Partnerships

Activities by various civic entities and NGOs that transcend the frameworks of nations

A wide range of participation and open discussion utilizing information technology

The importance of partnership among various stakeholders towards building sustainable societies was highlighted.

Sustainable Development Goals (SDGs)

- The "Millennium Development Goals (MDGs)" were adopted by UN member states at the UN Millennium Summit in New York in 2000, as common goals of development set out by international society to be achieved by 2015.
- Post-2015, the shift is from the MDGs (8 goals), which are oriented to developing countries, to the "Sustainable Development Goals (SDGs) "(17 goals and 169 targets) that encompass common global issues shared by the international community, emphasizing universality.
- The SDGs adopted in Sep 2015 cover a wide range of sustainability issues including the ending of poverty and hunger, improvement of health and education, enhancing of sustainability of cities, dealing with climate change, conservation of oceans and forests, etc.
- 5 key elements to achieve the SDGs are: people, planet, prosperity, peace and partnership.
- SDGs are more people-centered, planet-sensitive, and adopt a holistic approach stressing the measurability of progress and impacts.
- SD is supported by environmental, social and economical aspects, and is established through striking a balance in achieving environmental protection, economic growth and social equity.

Key elements in achieving SDGs

Sustainable Development

17 goals
169 associated targets
230 Indicators are currently proposed

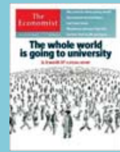
17 Sustainable Development Goals

Goal 1. End poverty in all its forms everywhere
Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
Goal 3. Ensure healthy lives and promote well-being for all at all ages
Goal 4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all
Goal 5. Achieve gender equality and empower all women and girls
Goal 6. Ensure availability and sustainable management of water and sanitation for all
Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all
Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10. Reduce inequality within and among countries
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12. Ensure sustainable consumption and production patterns
Goal 13. Take urgent action to combat climate change and its impacts*
**Acknowledging that the UNFCCC is the primary international, intergovernmental forum for negotiating the global response to climate change.*
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

SDGs: 17 Goals and 169 Targets for 2030

Pros
- Inclusiveness: "No one will be left behind"
- Universality: apply both for developed and developing countries
- Diversity: targets could be set at national level (guided by global ambition), indicators could be complemented at regional/national levels
- Integration: Economic, Social and Environmental dimensions
- Address concrete behaviors

Cons
- Too many goals and targets (i.e. Economist Mar 28)
- Not "easy to understand"
- May take resources out from not-listed areas
- Low level of concern in developed countries
- Non legally binding



Three Challenges to Governance for the SDGs

- Problems of human well-being (unachieved MDGs)
- Unprecedented changes in the nature
  - Connected problems (scale and scope): problems emerged from one country cause problems in other countries
- Governance - Diversity of stakeholders
  - Diversity of problem solving
  - Generating new ideas
  - New types of networks

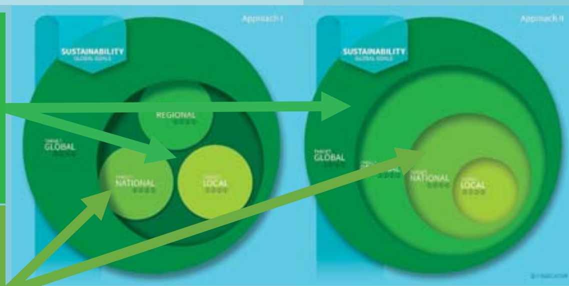
David Griggs, Mark Stafford-Smith, Owen Gaffney, Johan Rockstrom, Marcus C Ohman, Priay Shyamsundar, Will Steffen, Gisbert Glaser, Norichika Kanie and Ian Noble, 'Sustainable Development Goals for People and Planet.' *Nature* (Vol 495, 21 March 2013).

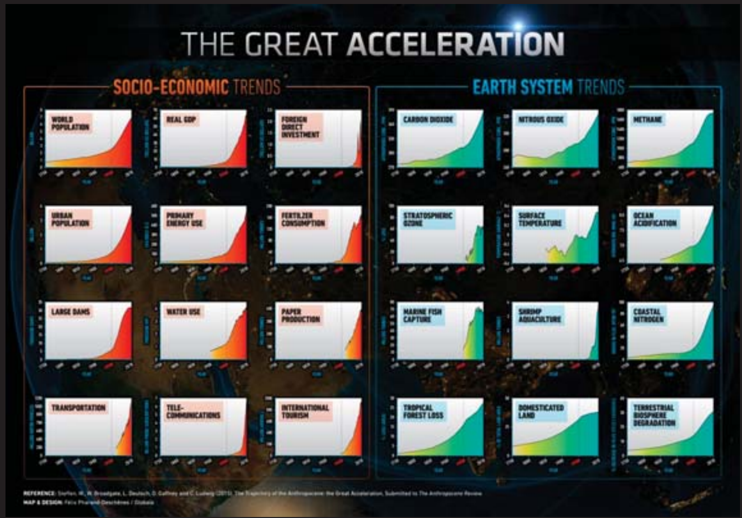
Need to Address SDGs at Multiple Levels of Governance

After the decision at the UN in September 2015, SDGs enter into regional, national and local level making, implementation, and follow-up and review.

Implementation of the SDGs at the UN level
What will implementation mechanism of the SDGs?
What is the mechanisms to link global and national/local levels?

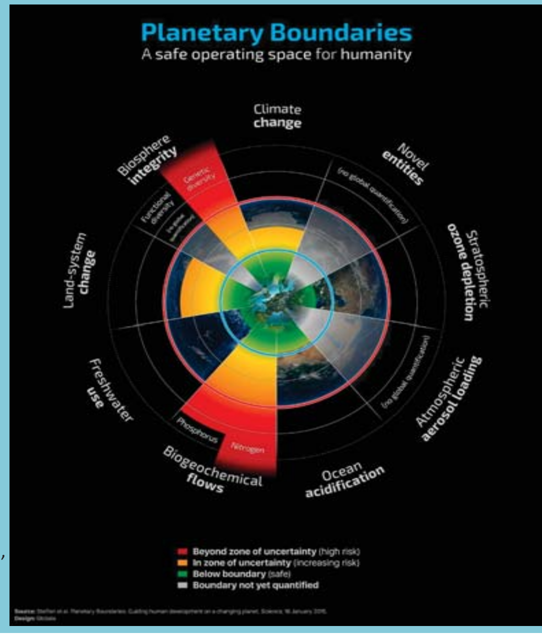
Regional and National level SDGs
How to make national-level SDGs?
How to make implementation mechanisms of the SDGs?
How to establish the process to get stakeholder engagement?
How to materialize integration of social, economic, and environmental sustainability?





(Prof. Johan Rockström, 2014)

Preconditions in the 21st Century
- Planetary Boundaries -

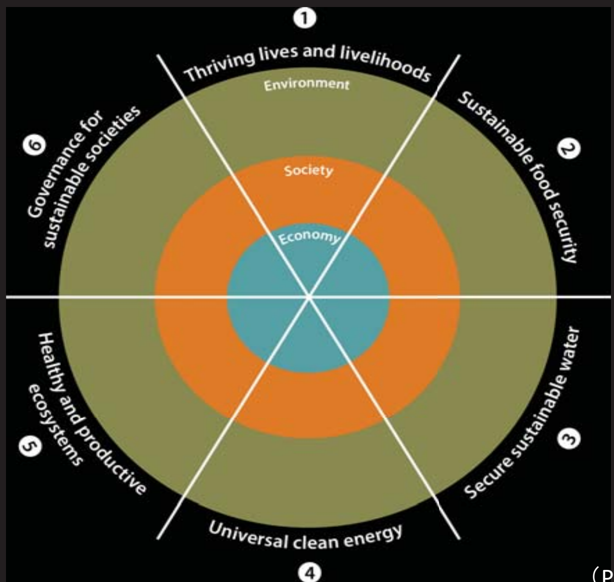


Steffen et al., Science (2015)

⇒ from Environmental Problems to Earth System Transformation
c.f. Anthropocene (Crutzen 2002)

A new direction: People and Planet

Setting the agenda on Sustainable Development Goals



(Prof. Johan Rockström, 2014)

SDGs' Targets related with Urban Environment and Health

9.4 upgrade infrastructure and greater adoption of clean and environmentally sound technologies

12.4 environmentally sound management of chemicals and all wastes throughout their life cycle

Air pollution

13.2 integrate climate change measures
13.3 Improve education, awareness-raising

Improve living conditions

11.3 enhance inclusive and sustainable urbanization
11.6 reduce the adverse environmental impact of cities
11.7 provide universal access to safe, inclusive and accessible, green and public spaces

Urban Environment ⇄ **Health**

Nutritional condition

Medical service

Sanitary education

8.4 Improve progressively global resource efficiency

Hazardous material

Waste management

Urban water management

6.2 adequate and equitable sanitation and hygiene
6.3 improve water quality
6.4 increase water-use efficiency
6.6 protect and restore water-related ecosystems
6.a international cooperation and capacity-building
6.b support and strengthen local communities

15.1 conservation, restoration and sustainable use of ecosystems
15.4 conservation of mountain ecosystems

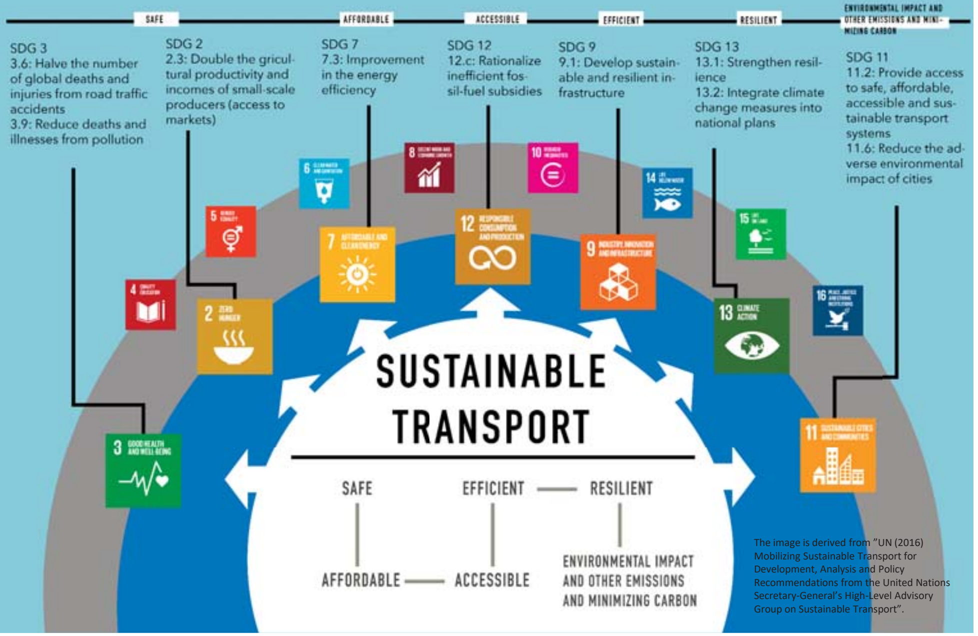
3.7 access to health-care services
3.8 achieve universal health coverage
3.9 reduce the number of deaths and illnesses
3.c increase health financing and the recruitment, development, training and retention
3.d Strengthen the capacity for early warning, risk reduction and management

Changing lifestyle

4.7 promote sustainable development

12.8 sustainable development and lifestyles in harmony with nature

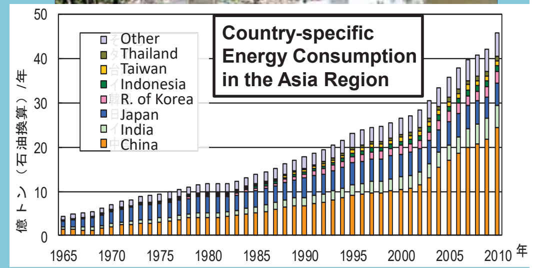
Sustainable Transport and SDGs



The image is derived from "UN (2016) Mobilizing Sustainable Transport for Development, Analysis and Policy Recommendations from the United Nations Secretary-General's High-Level Advisory Group on Sustainable Transport".

Rapid Growth in Asia

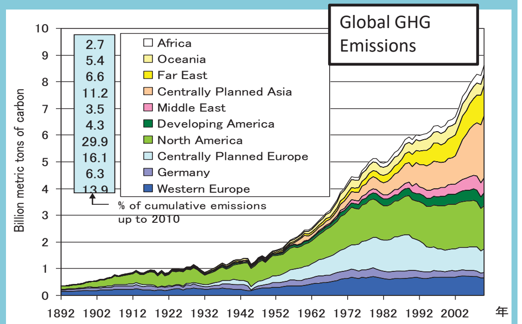
- Mass Consumption of Energy
  - Urbanization
  - Increase in distances traveled
  - Urban infrastructure-building and a "car society"
  - Westernization and higher incomes
  - Lifestyle changes reflecting the above
- Environmental Pollution
  - Deterioration in the urban water environment due to sewage from homes and commercial facilities.
  - Air pollution from heavy automobile traffic
  - Improper collection and treatment of an ever-increasing volume of solid waste, resulting from mass consumption.
- Ecosystem Destruction
  - Eradication of life forms as a result of urbanization and disorganized, unplanned land use.
  - Destruction of reciprocal relationships between life forms due to environmental pollution.
  - Improper management of landscapes in conjunction with rural depopulation.

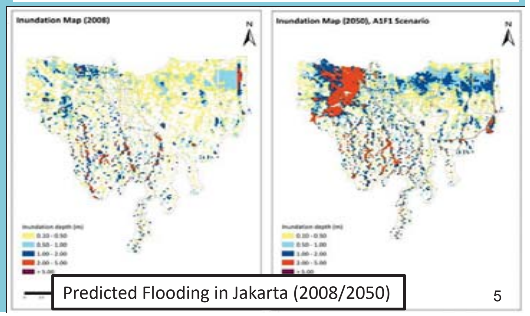


Redrawn from BP Statistical Review of World Energy 2010

Global Warming is Accelerating

- Greenhouse gas (GHG) emissions are increasing by the year.
  - In emerging economies, low-carbon efforts are hindered by rapid economic growth.
  - In advanced economies, the structure of society resists change.
- Impacts of climate change
  - Extreme weather phenomena (torrential rains, flooding) increasing in number and scale.
  - Ecosystems disrupted by local temperature changes.
  - Potential for new and resurgent infectious diseases.
  - Potential for drought and advance of desertification in arid regions.
  - Damage to coastal cities from rising sea levels.

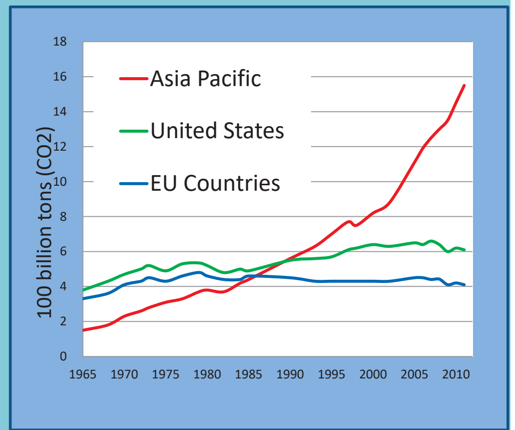




Predicted Flooding in Jakarta (2008/2050)

Building Low-Carbon Societies in Asia

- Stalled efforts toward low-carbon societies in Asia
  - Perception that low-carbon efforts will hinder economic growth
  - Added economic burden
- Sustainable region-building
  - Society-building grounded in economic growth while optimizing energy, environment, and ecosystems
  - Clarifying the reciprocal relationships between the three Es—energy, environment, and ecosystems—and finding optimal region-specific solutions
  - 3E Nexus Initiative Recommendation

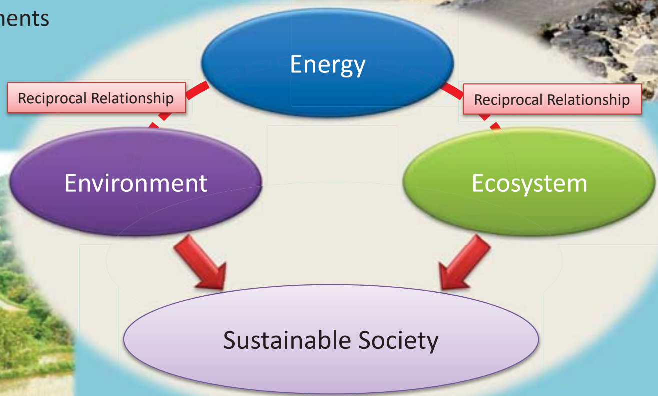


Rapid Rise in CO2 Emissions from Asia

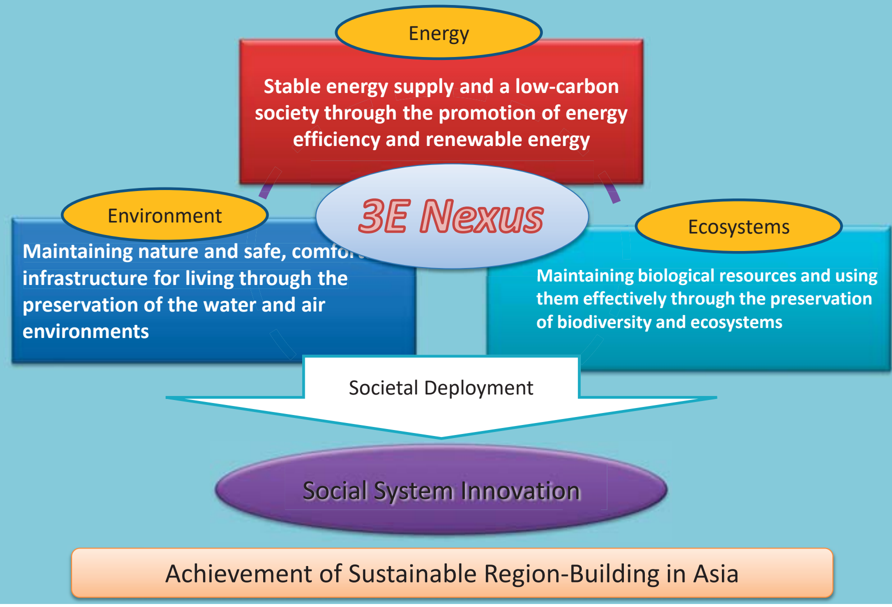
Redrawn from BP Statistical Review of World Energy 2012

3E Nexus Initiative

- An initiative to optimize reduction of energy use, environmental rehabilitation and management, and ecosystem conservation and management in combination, while improving infrastructure, building low-carbon societies, and creating sustainable, sound urban and rural environments

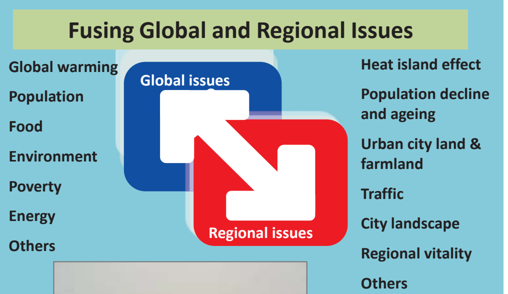


Promoting Social System Innovation Through the 3E Nexus Initiative



3E Nexus Initiative in the Asia-Pacific Region

- Japan is committed to promote low carbon societies within and outside the country with a greater emphasis on the Asia-Pacific region.
- Seeking solutions for both global and regional issues, for both developed and developing countries.
- Not only for promotion of low carbon society but also towards improving regional environment and ecosystem.
- As well as contributing to the solution of environmental issues, also leading to the improvement of human well-being.



PM2.5 pollution (Zhenjiang, China)

Thank you for your attention!

Session 1: Parallel Session of Main Annual Conference (Symposium)

Session 1: Panel Discussion "Mobility & Road Safety Managements"
Moderated by Mr.Silpachai Jarukasemratana, Former Permanent Secretary of MOT, Thailand
Mobility and Road Safety Managements in Australia Perspective By Dr. Lori MOOREN, Transport and Road Safety Research, The University of New South Wales, Australia
Road Safety Management in Japan By Mr. Yasushi NISHIDA, Institute for Traffic Accident Research and Data Analysis, Japan
Mobility and Road Safety Managements in China By Prof. Dr. Shengchuan ZHAO, Dean of School of Transportation and Logistics, Dalian Univ., of Technology, China
Accident and Road Safety Management in India By Asst.Prof.Dr. Digvijay S. PAWAR Dept. of Civil Engineering, India Institute of Technology, Hyderabad, India
Accident and Road Safety Managements in Thailand By Prof.Dr. Pichai TANEERANANON Prince of Songkla University,Thailand

Moderator of <Session 1>

Mr. Silpachai Jarukasemratana
Former Permanent Secretary of MOT, Thailand
E-mail: silpachai151@gmail.com

Brief Biography:

Mr. Silpachai Jarukasemratana served as an Independent Director at Thai Airways International Public Company Limited since January 20, 2012. Mr. Jarukasemratana serves as the Deputy Permanent Secretary/Acting Permanent Secretary to the Ministry of Transport.
He was the first ATRANS Chairperson serviced form 2007-2009.
Mr. Silpachai is now ATRANS Honorable Advisor.

Education:
MS: University Of London

First Speaker of <Session 1>

Lori Mooren, PhD
Senior Research Consultant, Transport and Road Safety (TARS,
University of New South Wales (UNSW), Australia,
E-mail: lorimooren@iinet.net.au

Brief Biography:

Lori Mooren, PhD, is a Senior Research Consultant, Transport and Road Safety (TARS), at the University of New South Wales (UNSW), Australia, as well as an independent road safety consultant with Safety and Communications Pty Ltd.

Her PhD was awarded by UNSW for her work to develop an evidence-based safety management system for heavy vehicle transport operations. She is accredited as a Registered Road Safety Professional by the Australasian College of Road Safety, and was awarded the status of Fellow in 2012, signifying recognition by her peers of her outstanding achievements in road safety.

Lori has been working in road safety for over 28 years. With her public health policy background, she was initially appointed to establish collaborative road safety programs with Police, Local Government, community organisations, Education and Health as well as to manage multi-media public education campaigns. She worked as a senior road safety policy and program manager for the Roads and Traffic Authority, NSW from 1989 until 2000, ultimately filling the role of General Manager, Road Safety. In 1998 she presided over the NSW government road safety program that achieved the lowest road fatality record since 1949. The road safety strategy she developed for the years 2000-2010 achieved road safety levels that rival the world's best performing countries.

She was the Project Manager for the production of a Global Good Practice Manual on Speed Management, co-sponsored by the World Health Organisation, World Bank, FIA Foundation and the Global Road Safety Partnership. She has been an invited speaker at many professional events, both private and public sector conferences and has published numerous peer reviewed papers and media opinion pieces.

Recognised as an international leader in the field, Lori is an invited member of the United Nations Road Safety Collaboration (UNRSC), and co-chairs the UNRSC Pillar 1 - Road Safety Management Project Group together with a World Bank representative. Her aims are to assist the development of effective road safety programs globally.

Her aims are to assist the development of effective road safety programs globally.

Mobility and Road Safety Management Australian Perspective
By Lori Mooren, PhD

Summary:

This presentation aims to explain the key elements of effective road safety management. The starting point is knowing how to define and analyse the problem of road injury. Since the late 1960s, road safety practitioners and researchers have embraced the scientific method of identifying road injury factors in crashes by examining what human, road and vehicle factors were present prior to, during and after the crash occurred. This was thought to guide road safety investments to the most prevalent injury risk factors.

Studies in a number of countries found that human factors were involved in more than 90% of road fatalities. However, this method of analysis is now thought to be insufficient, in that it implies that human factors are behavioural choices that can be changed. While, behaviour change programs have been important in efforts to reduce road injury, managing the road mobility system such that human risk factors are all addressed requires an understanding that humans are fallible and physically vulnerable.

Human road users make mistakes. Moreover, not only are they poor at judging risks, they also tend to optimise the benefits of risk behaviour. Road user risk behaviour can be influenced through education and law enforcement. This continues to be a very effective way of reducing road trauma. However, human mistake-making cannot be eliminated.

Safe system principles underpinning road safety strategies in Australia since 2004, call for a recognition of the responsibility of road managers to design and manage a road system that places human fallibility and vulnerability as the design/management starting point. The road and traffic system should thus be designed to accommodate and forgive human error. Road crashes that happen due to human error must be made survivable in a safe system. That is, the design of the road, traffic and vehicle systems are to include safe guards that will not enable serious injury.
Speed management is a pivotal factor in safe system management. This is because the speed of impact in a crash determines the injury severity of the crash. The risk of fatality from a road crash rises exponentially with small increases in speed.

Important actions in road safety management include:

- *Measurement and definition of the road injury problem;*
- *Research for evidence-based solutions;*
- *Development of targets, objectives and strategies;*
- *Resourcing and interagency collaboration; and*
- *Planning and implementing actions.*

Road safety at its best is multi-disciplinary and collaborative. Road authorities, police, researchers, community groups, health authorities and educational institutions all have roles to play. When these bodies act in concert, synergies of these coordinated actions tend to multiply the effectiveness of the actions.

A number of countries have been successful in reducing road fatalities by implementing road safety programs. Australia is one of the most successful countries in making these achievements. The States of New South Wales and Victoria have led this effort since introducing compulsory seat belt and motorcycle helmet legislation in the early 1970s. Multi-faceted road safety strategies have been in place since 1990 in these States involving the road authorities, police, local governments, education and research sectors, automobile clubs and others.

Specific pilot projects have also achieved measurable results in New South Wales. These include the introduction of double (license) demerit points for speeding over holiday periods, and change of the urban speed limit from 60km/h to 50km/h.

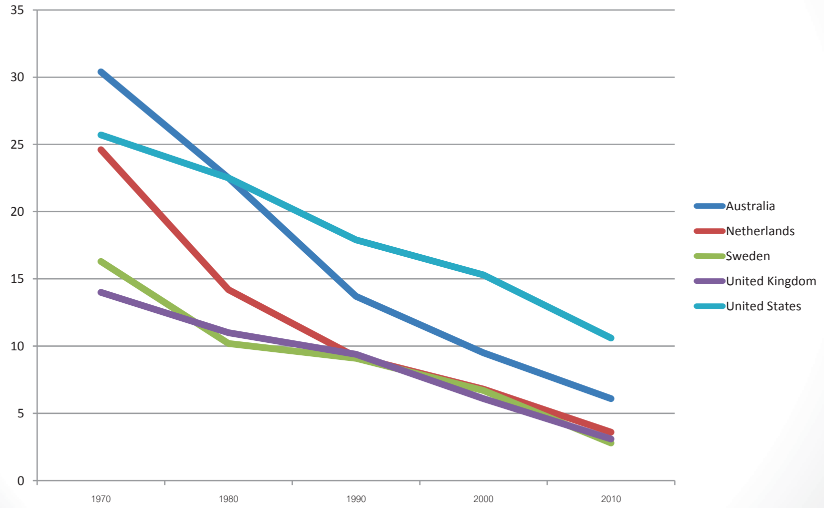
In conclusion the following points summarise important elements of road safety management.

- ***Data collection and research** – define the problem, find effective solutions & evaluate*
- ***Interagency partnerships** – collaborate to optimize effectiveness*
- ***Community support and political will** – campaign to create a demand for road safety*
- ***Safe system approach** – use human factors as your design and management parameter*

Mobility and Road Safety Management Australian Perspective

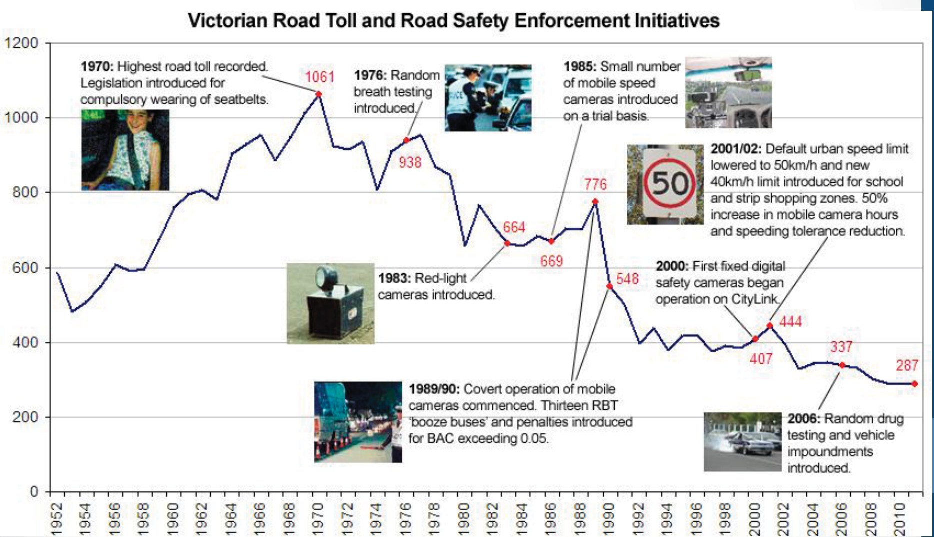
Lori Mooren, PhD, Consultant, Safety and Communications,
Member, United Nations Road Safety Collaboration
Affiliated with Transport and Road Safety Research Centre (TARS),
University of New South Wales, Australia

Road death trends per 100,000 population – what is **possible**



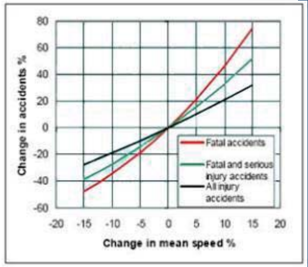
Source: IRTAD 2011 Annual Report, OECD/ITF 2012 (IRTAD, 2012)

How Australia did it



Three keys to success

1. Scientific analysis



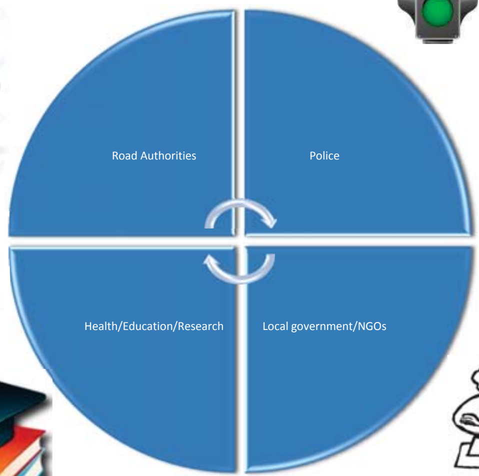
2. Collaboration

3. Community demand and Political will

Road safety **management**

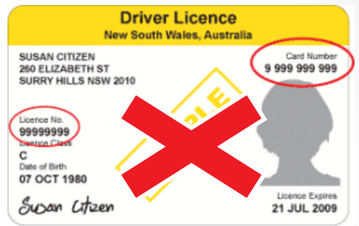
- Measure and define the problem
- Find evidence-based solutions
- Develop targets, objectives & strategies
- Determine resources & who can help
- Plan actions and negotiate/collaborate

Collaboration



Double **demerits** for speeding

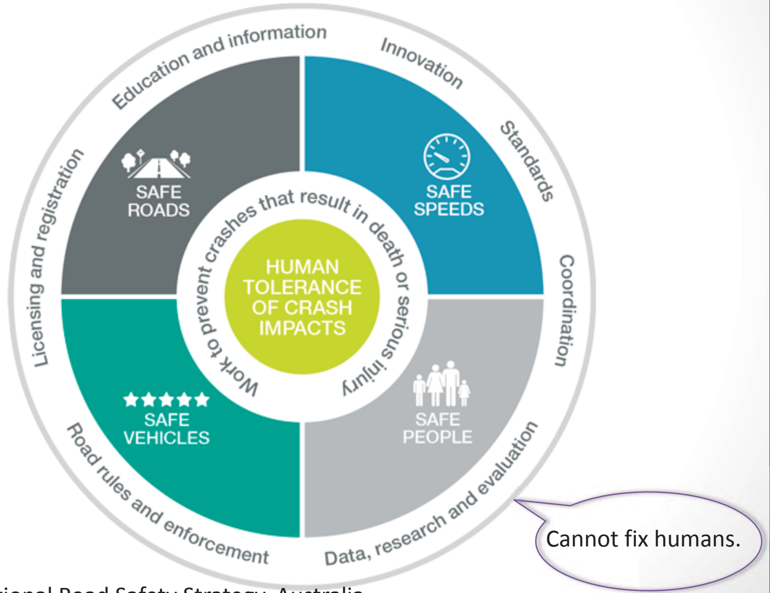
- **Inputs -** Regulatory change, public education and enforcement campaign
- **Process -** 45 days over 7 holiday periods special penalty applied and campaigns were conducted
- **Outputs -** over $1 million media publicity, high stakeholder support
- **Outcomes (lower order) –**
  - traffic infringements
  - awareness and support
- **Outcomes (higher order)**
  - Decrease of 27 or 34% of fatal crashes



50km/h Urban Speed Trial

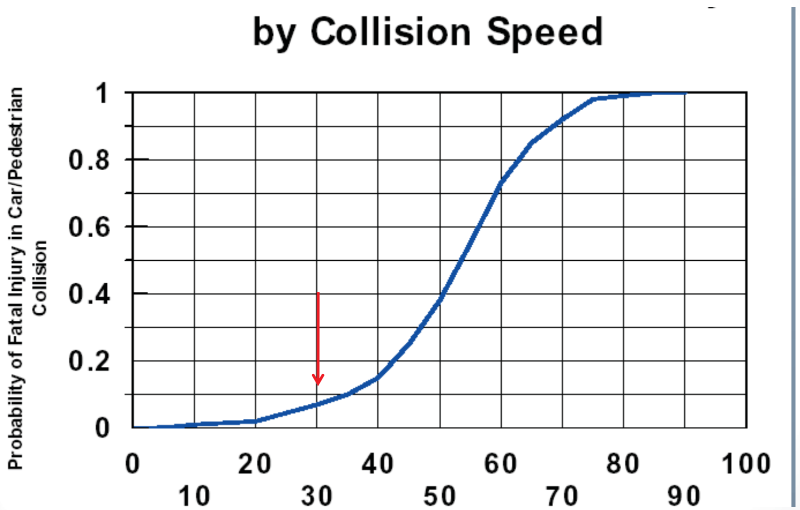
- **Inputs** - RTA funding/signage, assistance, publicity
- **Process** - Minister invited Councils/RTA set up precincts for 3-month trial, public education and survey work conducted
- **Outputs** - all major agencies/media & Government supported the trial, over 26 Councils sought participation
- **Outcomes (lower order)**
  - Speed reductions of 1.5 - 2 km/h in trial areas
  - Two thirds of the community support the limit
  - 45% of Councils support it, 37% oppose,18% are undecided
- **Outcomes (higher order)**
  - Crash and casualty reductions of 12% in trial areas (vs 3% and 5% for the rest of the State)

Safe System approach



Source: National Road Safety Strategy, Australia

Speed management is critical



Reference: Kare Rume, "Speed – a sensitive matter for drivers", Nordic Road and Transport Research No. 1 (1999) see:http://www.vti.se/nordic/default.htm

Implications of Safe System

- Everyone assumes more responsibility – *stop blaming humans for being human*
- Think more holistically about inherent risks in the public road and traffic system – *do not expect that humans will behave in the way you expect*
- Understand that technologies exist to prevent all road deaths – *yes, it is now possible*
- Engineering a safe system is cost effective – *the burden of injury is expensive*
- The interactions between elements of the system should be the key focus in road safety – *that's how systems work*
- Change mind sets – *it is just not good enough to chip away at the edges*

Identify & **define the problem**, then implement solutions

Photo source: AIPF

Crashes will happen.

Do what is needed to ensure that they don't seriously injury people.

The **Australasian Road Safety Conference** is the largest road safety Conference in the Southern Hemisphere.

ARSC2017 will showcase the regions' outstanding engineers, researchers, practitioners, policy makers and industry spanning the plethora of road safety issues;

- Road Safety Management
- Infrastructure
- Safe Vehicles
- User Behaviours
- Post-Crash Care

The comprehensive 3 day scientific program will showcase the latest:

- Research
- Education
- Policing programs
- Policies and management strategies
- Technological developments in the field
- National and international keynote speakers
- Oral and poster presentations
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DISCOUNTED REGISTRATION RATES MAY BE APPLIED FOR DELEGATES FROM LMICs

FURTHER INFORMATION: Lynne Greenaway arsc2017@eecw.com.au
Tel: +61 8 9389 1488 http://australasianroadsafetyconference.com.au/

Summary **Points**

- **Data collection and research** – define the problem, find effective solutions & evaluate
- **Interagency partnerships** – collaborate to optimize effectiveness
- **Community support and political will** – campaign to create a demand for road safety
- **Safe system approach** – use human factors as your design and management parameter

- **Email** lorimooren@iinet.net.au

Thank you and good luck!

Second Speaker of <Session 1>

Mr. Yasushi NISHIDA
Institute for Traffic Accident Research and Data Analysis, Japan
E-mail: nishida@itarda.or.jp

Brief Biography:

Research Specialist and Manager of Research Section 1,
Institute for Traffic Accident Research and Data Analysis (ITARDA)

Born: 1951
Background: Traffic Engineer
Specialty: Road traffic accident analysis (statistics), Traffic safety education

Job careers:
A researcher and a manager of Traffic Division, National Research Institute of Police Science (NRIPS, 1976-2012) - mother office, and temporarily worked as follows,
A technical consultant of JICA for Traffic Training Center, University of the Philippines (1981-83),
A data analyst of Traffic Planning Division, Traffic Bureau of National Police Agency (1986-89),
A manager of Road Traffic Control Center, Traffic Division, Fukuoka Prefectural Police (1989-1991)
A manager of ITARDA (1992-94, 2006-09)

Relation with ITARDA: one of the members for working team to establish ITARDA, and involved in several ITARDA's projects. The idea of integrated road traffic accident data bases have been discussed at NPA since 1990s.

Major studies:
Road traffic accident analysis and safety program for the elderly considering birth cohort (IATSS Research 2-02, 1996)
Driving characteristics of the elderly: Risk compensation of the elderly driver from the viewpoint of reaction behavior (JSAE Review 20-3, 1999)
The effect of ABS as a preventive safety device: The result of statistical analysis using integrated road traffic accident data bases (Proceeding of 21th of Conference of ESV2009),
Analyzing accidents and developing elderly driver-targeted measures based on accident and violation records (IATSS Research 39, 2012)

Road Safety Management in Japan
By Mr. Yasushi NISHIDA

Summary:

1. Trend of Road Traffic accident in Japan

The number of road traffic accident fatalities 16,765 in 1970 was the worst, but the number in 2016 was 3904 as a result of a lot of effort by the public and private sectors under the several Traffic Safety Basic Plans while the motorization has been developing constantly.

2. Five-year Traffic Safety Basic Plan

The first 5-year Traffic Safety Basic plan was established in 1971, and the target "pedestrian fatalities 4000 or less" was achieved. But the targets (from 2nd to 6th plan) were not achieved. In 2003 Prime Minister Junichiro Koizumi at that time set an ambition target"4198 or less by 2013", and the target of 7th plan was achieved.

The characteristics of road traffic accident have been changing according to the change of road traffic or social/economic situations, and a lot of measures were listed in the 10th 5year Traffic Safety Basic Plans. But most of the items/contents are the same as those of previous plans.

3. Example of Recent Measures

The one of the recent targets is senior drivers, and a lot of measures for them are implemented. Driver License control is very important, and the amended Road Traffic Law was implemented on March 2017. Drivers aged 75 years or older are imposed a screening test at license renewal or penalized for traffic violation. Voluntary surrender of driver's licenses is also a measure for senior driver, but the ratio of surrender is very low.

High technology is indispensable for traffic safety now. Several systems have been implemented in motor vehicles, and those may contribute the reducing of traffic accident. Doctor-Helicopter systems are implemented most of prefectures, and those may contribute the reducing of traffic fatalities.

4. Review of Measures

The reducing of traffic fatalities is the most important target, and a lot of measures have been implemented. But the situation of road traffic has been changing, and the situation might be different from that of the time when the measure was implemented. Measures are necessary to be review and revised.

5. Anxiety and Expectation

There are several problems with a road traffic safety in Japan. Aging of population is one of them. The increase of old people whose fatal rate is high means the rapid the increase in fatalities.

But there are potential technique/idea for traffic safety, the effect of automated driving system was estimated to be large. The more advanced the system is, the larger the effect is expected to be.

6. Epilog

The target of the 10^{th} Traffic Safety Basic Plan is hard, but the trend of the decreasing of traffic fatalities has not been changed.

Road Safety Management in Japan

Yasushi NISHIDA

Institute for Traffic Accident Research and Data Analysis

10th ATRANS Annual Conference 2018.8.18

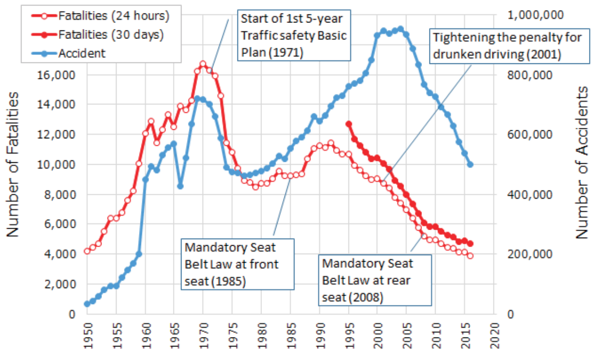
ITARDA 交通事故総合分析センター Institute for Traffic Accident Research and Data Analysis

Prolog <Topics>

1. Trend of Road Traffic accident in Japan
2. Five-year Traffic Safety Basic Plan
3. Example of Recent Measures
4. Review of Measures
5. Anxiety and Expectation
6. Epilog

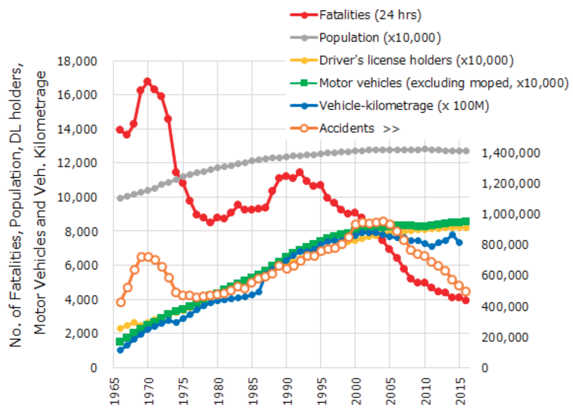
1. Trend of Road Traffic Accidents

~ The number of fatalities have been decreasing in Japan because of several measures.



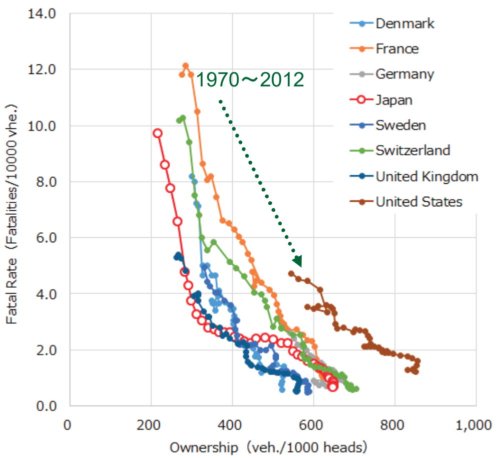
■ Motorization and Traffic Accidents

~ The trend of the number of fatalities differs from that of development of motorization.



■ Smeed Model : Motorization

～ The relative position of Japan was changed, …



Source : International Traffic Safety Data and Analysis Group(IRTAD)

2. Five-year Traffic safety Basic Plans

～ The recent targets are hard to achieve.

Term	National Target (by the end of term)	Reults
1st (1971-1975)	Pedestrian fatalities 4,000 or less, 50% reduction of the estimation, 8000(Y1975)	3,732 in 1975(achieved)
2st (1976-1980)	Fatalities 8,382 or less , 50% of the largest 16765 (Y1970)	8,760 in 1980 (not achieved)
3rd (1981-1985)	Fatalities 8,000 or less	9,261 in 1985 (not achieved)
4th (1986-1990)	Fatalities 8,000 or less	11,227 in 1990 (not achieved)
5th (1991-1995)	Fatalities 10,000 or less, the estimation 13500 (Y1995)	10,679 in 1995 (not achieved)
6th (1996-2000)	Fatalities 10,000 or less by the year 1997 Fatalities 9,000 or less by the year 2000	9,942 in 1997 (achieved) 9,066 in 2000 (not achieved) 9,006 in 1999 (not achieved)
7th (2001-2005)	Fatalities 8,466 or less, the lowest record 8466(Y1979) since 1970	6,871 in 2005 (achieved)
8th (2006-2010)	Fatalities 5,500 or less and casualties 1 Million or less	Fatalities 4,922, Casualties 0.90 M in 2010
9th (2011-2015)	Fatalities 3,000 or less and casualties 0.7 Million or less	Fatalities 4,117(not achieved), Casualties 0.67 M (achieved) in
10th (2016-2020)	Fatalities 2,500 or less and casualties 0.5 Million or less	Fatalities 3,904, Casualties 0.62M in 2016

fatalities = 24hrs. Fatalities

Source : http://www8.cao.go.jp/koutu/taisaku/h28kou_haku/pdf/zenbun/h27-1-1-1-1.pdf

■ 10th Traffic Safety Basic Plan -1

1. Towards a Society without Traffic Accidents

People First Traffic Safety Philosophy

Active Use of Advanced Technologies

2. Goals of Safety in Road Transport

To achieve the safest road transport in the world by decreasing the number of fatalities within 24 hours to less than 2,500 (*) by 2020.

To reduce the number of casualties to less than 500,000 per year by 2020

http://www8.cao.go.jp/koutu/taisaku/h28kou_haku/english/pdf/f1.pdf

■ 10th Traffic Safety Basic Plan -2

3. Measures for Safety in Road Transport

1) Subjects to be Dealt with in a Focused Manner in order to Reduce Damage Caused by Traffic Accidents

A. Ensuring Safety of Elderly People and Children

B. Ensuring Safety of Pedestrians and Bicycles

C. Ensuring Safety in Community Roads

2) Matters to be Focused in Order to Create an Environment where Traffic Accidents do not Occur Easily

A. Use of Advanced Technologies

B. Promotion of Finely-tuned Measures based on the Actual Situation of Traffic Accidents

C. Promotion of Community-based Traffic Safety Measures

http://www8.cao.go.jp/koutu/taisaku/h28kou_haku/english/pdf/f1.pdf

■ 10th Traffic Safety Basic Plan -3

Policies and Measures to be Implemented

1) Development of Road Transport Environment
2) Thorough Dissemination of Traffic Safety Philosophy
3) Ensuring Safe Driving
4) Ensuring Safety Performance of Vehicle
5) Maintenance of Road Transport Order
6) Improvement of Rescue and Emergency Medical System
7) Enhancement and Promotion of Victim Support
8) Enhancement of Research and Development and Investigative Research

http://www8.cao.go.jp/koutu/taisaku/h28kou_haku/english/pdf/f1.pdf

3. Examples of Recent Measures

Senior Drivers

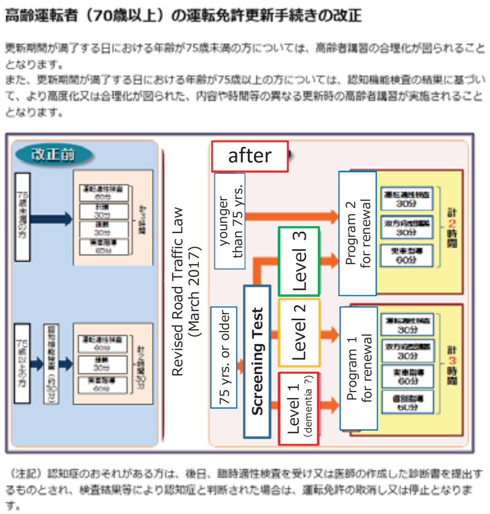
Screening test of dementia
Voluntary surrender of driver's license

Advanced Safety Car

Doctor Helicopter

■ Measure for Senior Drivers-1

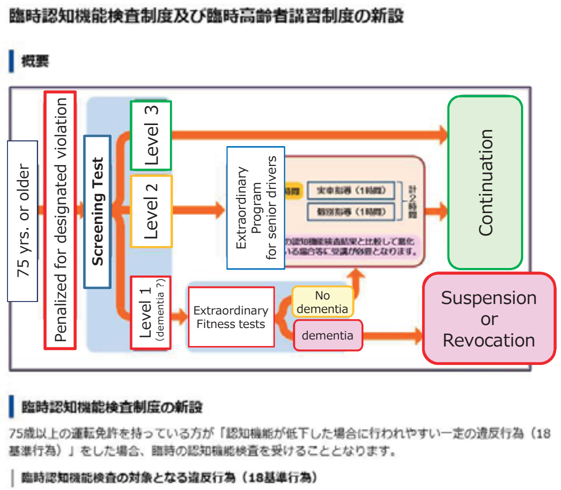
~ Screening test for dementia



http://www.keishicho.metro.tokyo.jp/menkyo/koshu/koureisha_anzen.html

■ Measure for Senior Drivers-2

~ Designated 18 violations for extraordinary screening test for dementia

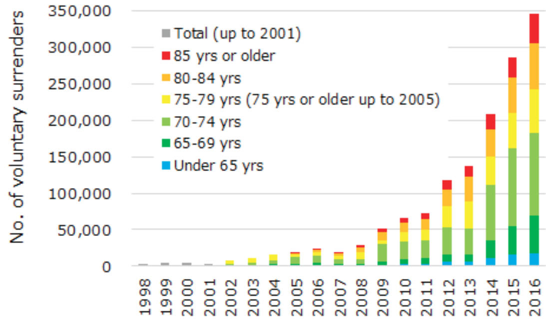


http://www.keishicho.metro.tokyo.jp/menkyo/koshu/koureisha_anzen.html

■ Measure for Senior Drivers-3

~ The number of voluntary surrender of driver's licenses is increasing, but the ratio is very low.

(Total driver's license holders : 82 million in 2016)



Source : Driver license Statistics, National Police Agency, Japan

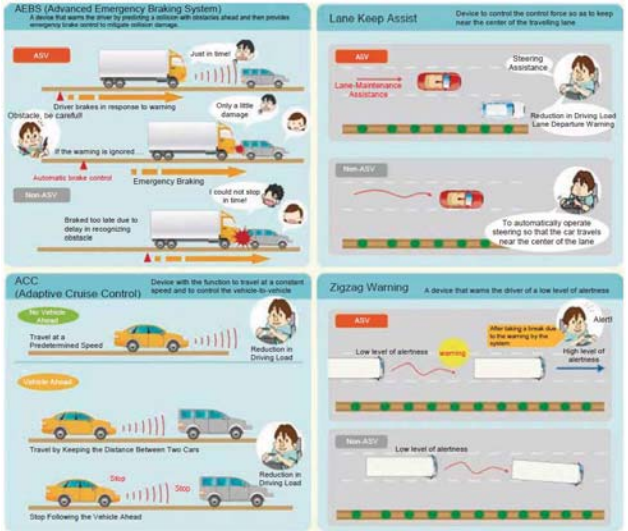
■ Examples of an advanced safety car

Advanced Emergency Braking System

Lane Keep Assist

Adaptive Cruise Control

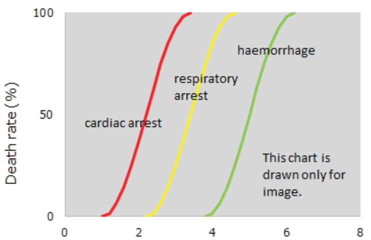
Zigzag Warning



http://www8.cao.go.jp/koutu/taisaku/h28kou_haku/english/pdf/f1.pdf

■ Doctor Helicopter

The shorter the transportation time, the lower the fatal rate.



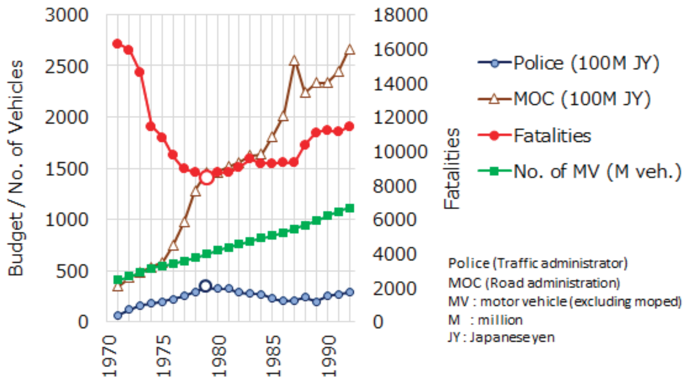
http://www.hemnet.jp/english/whats/index.html

4. Review of Traffic Safety Measures

- ■ Insufficient estimation/reduction of budget (1980)
- ■ Allow a bicyclist to ride along sidewalk (1971 ~)
  To prevent bicycle accidents
- ■ 3-ban campaign for high school student (around 1975 ~ 1990)
  To prevent motorcycle accidents by high school students

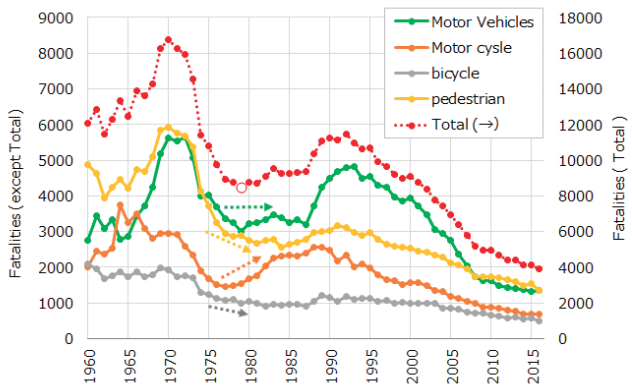
■ Insufficient Estimation

~ The number of fatalities was not decrease sharply as before, and the number of vehicles was estimated to be increased constantly, … but the budget was reduced!

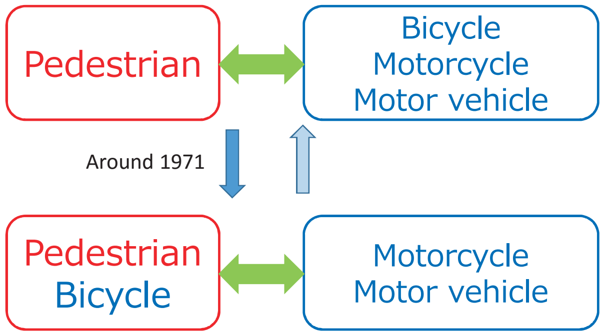


■ Fatalities by road user type

~ The trends differed around 1980



■ Allowing a bicyclist to ride along sidewalk



- The number of bicycle accidents were decreased.
- Pedestrians and bicycles have shared the same space.
- Behavior of bicycle turned to be disorderly.
- The number of Pedestrian vs bicycle accidents have been increased.

■ 3-ban campaign for high school student

To prevent motorcycle accidents by high school students

allow them to

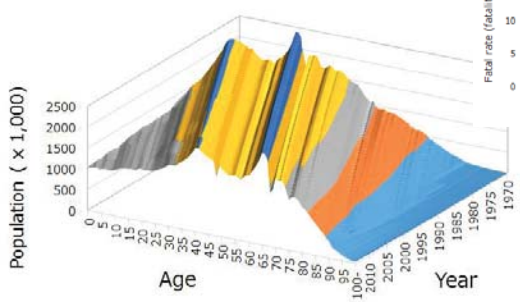
- ■ Not to get a rider license
- ■ Not to buy a motorcycle
- ■ Not to ride a motorcycle

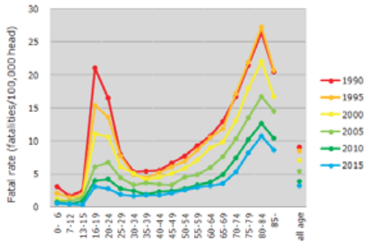
There was an effect in short term, but this campaign might loose an opportunity to learn a riding/driving manner at the best time.

There are a lot of discussion, and negative opinions are in a majority now.

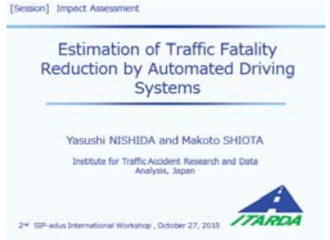
5. Anxiety ~ Aging of Population

~ The increase of old people whose fatal rate is high means the rapid the increase in fatalities.





■ Expectation ~ New Technologies


[Session] Impact Assessment

Estimation of Traffic Fatality Reduction by Automated Driving Systems

Yasushi NISHIDA and Makoto SHIOTA

Institute for Traffic Accident Research and Data Analysis, Japan

ITARDA

According to Trial estimations ;
(case for 4373 fatalities in 2013)

- 117 (79%) fatalities out of 148 in rear-end collision on public road might be saved by rear-end collision damage reduction equipment.
- 608 pedestrian fatalities out of 1123 might be saved by autonomous pedestrian detection system.

6. Epilog

In 2020
can we achieve the target
of 10th Traffic Safety Basic Plan, 2500 ?

Estimation of the number of fatalities		
Methods (independent variable or parameter*)		**2020**
Vehicel-kilometrage		2,892
		3,050
Population by age group	case 1	2,538
	case 2	2,959
	case 3	2,669
Rate considering birth cohort*	all type	3,399
	by user type	3,606

Source : http://www8.cao.go.jp/koutu/chou-ken/pdf_1/all-1.pdf

Thank you
very much
for your attention!

nishida@itarda.or.jp

Third Speaker of <Session 1>

Prof. Dr. Shengchuan ZHAO
Dean of School of Transportation and
Logistics of Dalian University of Technology (DUT), China
E-mail: szhao@dlut.edu.cn

Brief Biography:

Dr. Zhao is a Professor and founding Dean of School of Transportation and Logistics of Dalian University of Technology (DUT), China. He is also Director of International Office of the university. Dr. Zhao was a Fulbright Scholar at Kennedy School of Government, Harvard University from 2008 to 2009 and a Visiting Scholar at the University of Texas at Austin in 1997 and Research Fellow of Japan Society for the Promotion of Science (JSPS) from 1996 to 1998. He has served as a transportation consultant in Tokyo from 1998 to 2004. He holds a Ph.D. in urban transportation planning from the University of Tokyo, Japan. His research interests are travel demand modeling and transportation policy analysis.

Dr. Zhao is director of International Society for Weigh-In-Motion (ISWIM). He serves as members of Committee on Intermodal Freight Transport of TRB (AT045), Committee on Freight Transportation Planning and Logistics (AT015), and overseas invited member of International Association of Traffic and Safety Sciences (IATSS). As Principal Investigator, he has overseen a number of projects funded by National Natural Science Foundation of China (NSFC), Asian Development Bank (ADB), Institute for Transport Policy Studies (ITPS) of Japan, The Korea Transport Institute (KOTI) and Ministry of Transport of China.

Dr. Zhao received International Outstanding Collaboration Award from Japan Society of Civil Engineers in 2016. He speaks Chinese, Japanese and English.

Mobility and Road Safety Managements in China
By Prof. Dr. Shengchuan ZHAO

Summary:

Traffic Safety Policies and Regulations Under Rapid Motorization in China

Professor Shengchuan Zhao

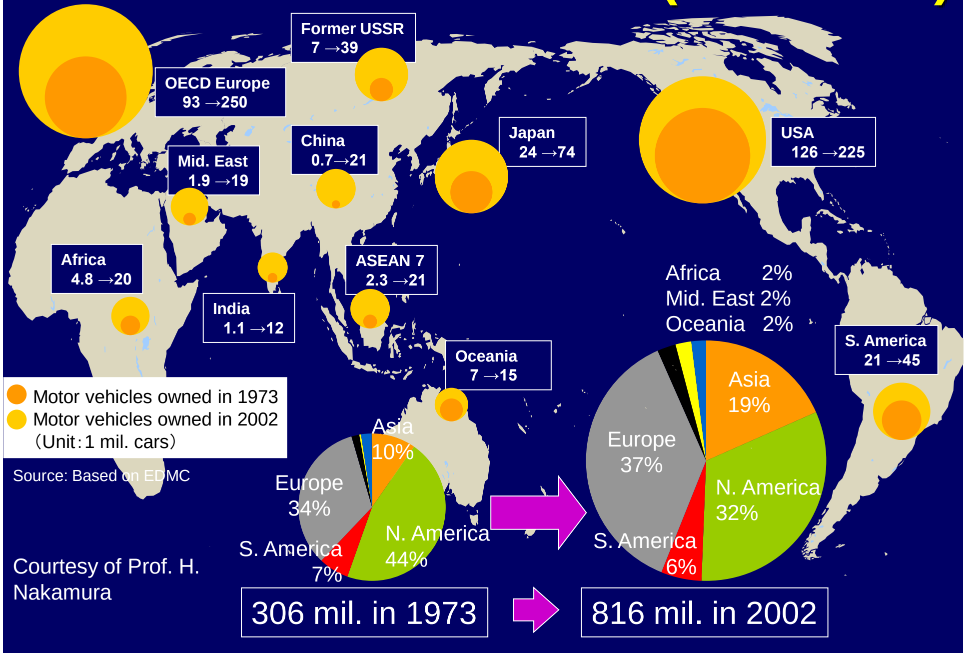
Dalian University of Technology, China
August 18, 2017

Outline

1. Rapid motorization in China;
2. Traffic safety policies and regulations;
3. Implications & sugesstions for Thailand

1. Rapid motorization in China

Motorization in the world (1973-2002)

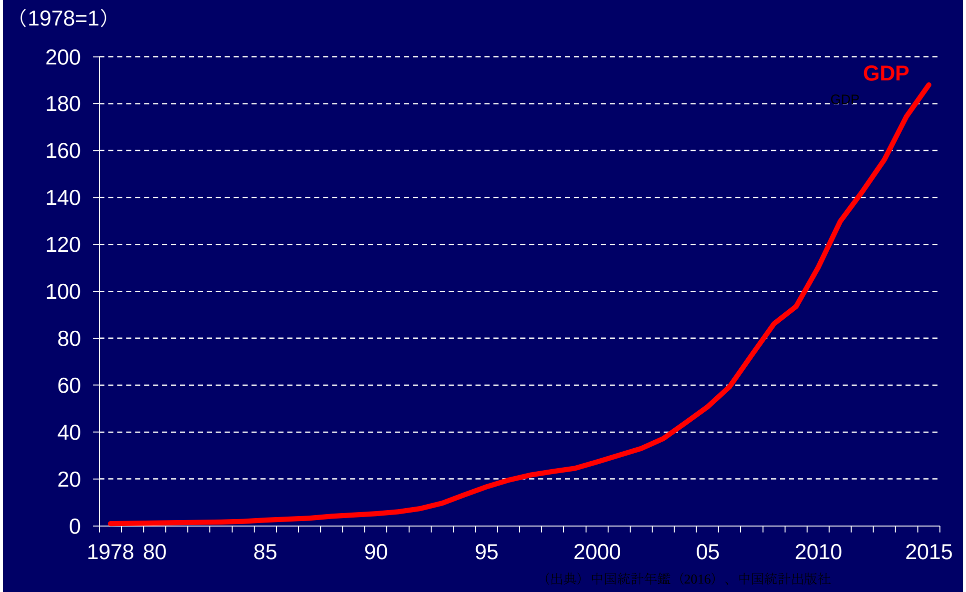


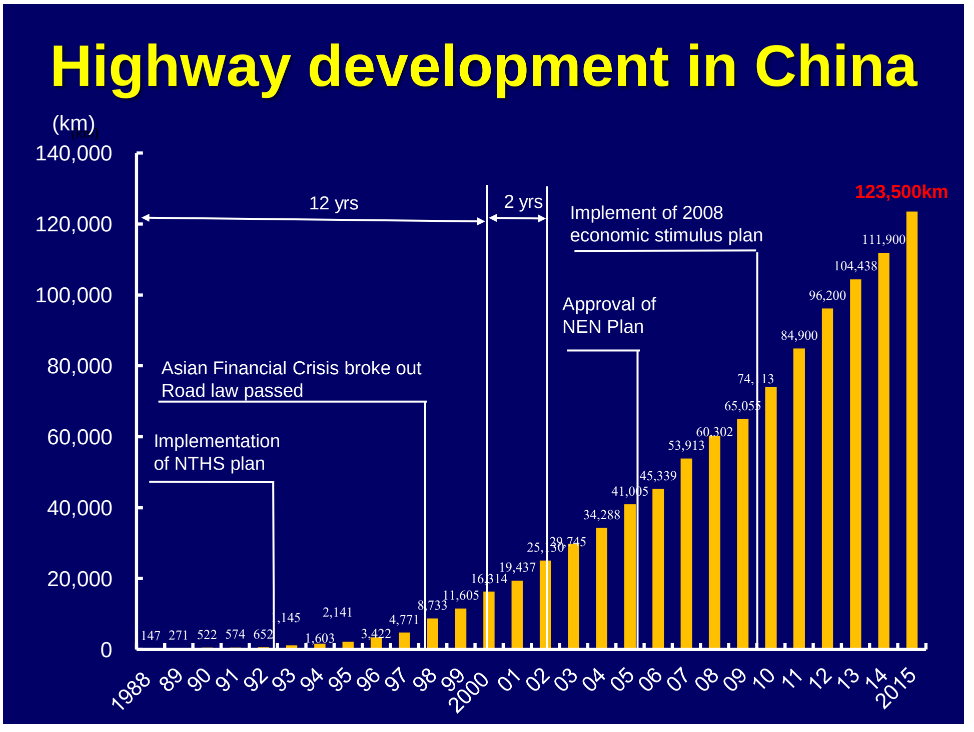
Courtesy of Prof. H. Nakamura

World car ownership (No. of cars per thousand people)

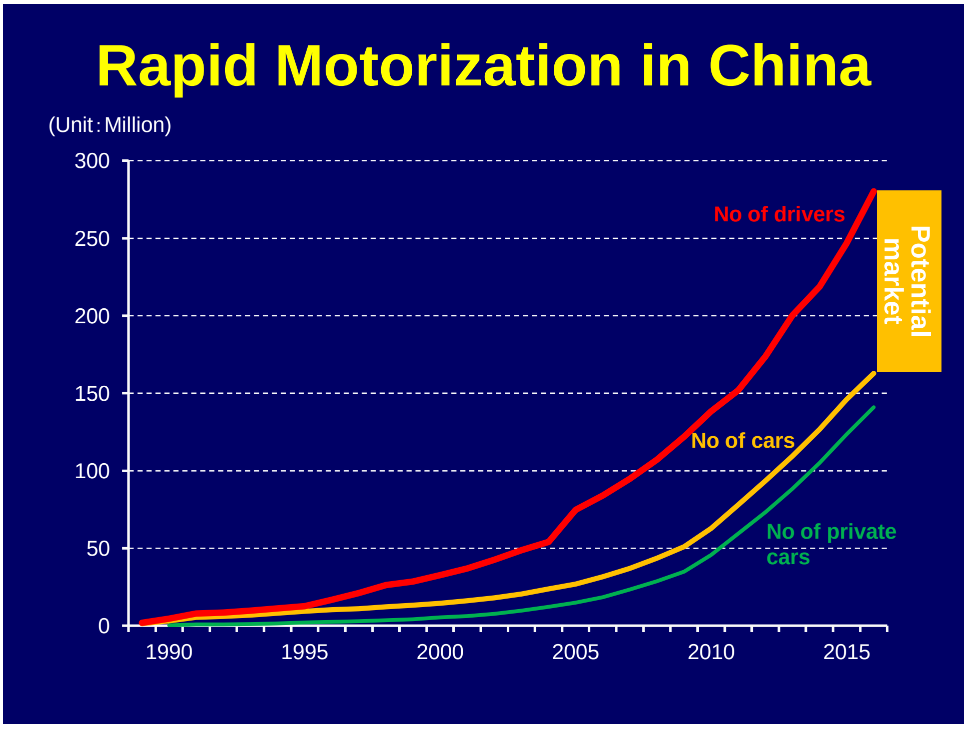
	1980	1990	2000	2004	2005	2006	2007	2008	2009	2014	2014/ 2000
China	0.9	4.6	12.9	20.2	23.5	27.3	32.0	38.1	45.5	104	8.1
Japan	324.2	465.2	572.4	584.2	592.2	593.6	592.4	591.4	578.9	608	1.1
Korea	13.2	78.7	242.0	315.1	323.5	332.5	342.3	348.4	358.7	399	1.6
India	2.3	4.6	7.4	13.2	13.6	14.7	15.6	15.7	13.9	30	4.1
USA	702.1	747.1	787.0	801.0	808.8	809.9	813.8	802.8	789.5	809	1.0
Canada	559.1	616.9	571.4	583.3	585.4	600.6	610.1	616.2	618.8	644	1.1
Brazil	83.7	77.2	91.1	116.1	123.7	127.9	135.8	143.1	153.0	207	2.3
UK	310.5	459.2	525.9	568.1	574.6	579.9	583.9	582.0	571.7	583	1.1
Germany	403.7	518.9	576.8	522.4	524.3	529.4	532.7	534.7	543.0	576	1.0
France	404.4	502.9	574.2	594.7	595.0	597.1	600.2	600.2	600.9	594	1.0
Italy	335.0	518.1	626.1	655.6	667.1	675.9	680.7	686.1	689.9	687	1.1
Norway	341.8	454.6	512.6	534.1	548.2	551.7	571.3	583.8	587.5	599 （2012）	1.2
Russia	64.3	79.9	176.3	206.7	216.4	229.4	240.3	270.6	281.4	351	2.0
Australia	509.0	565.5	654.0	650.3	661.7	674.5	680.6	695.9	704.4	715	1.1
South Africa	118.3	128.1	138.4	136.2	142.9	147.7	151.6	150.7	156.1	178	1.3
World	96.0	108.8	124.0	134.7	136.5	139.1	141.7	144.2	141.3	167	1.3

Economic growth in China



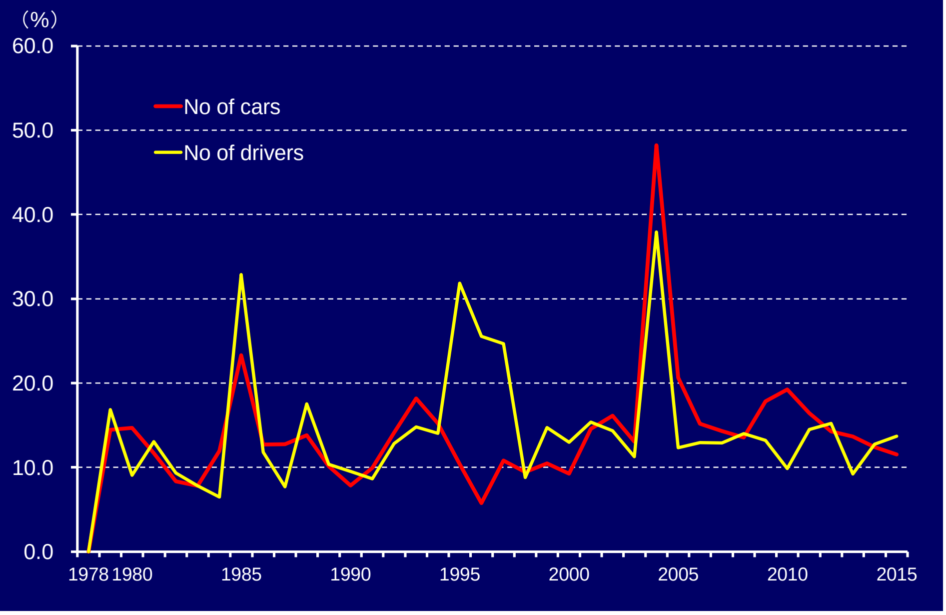


Highway development in China
(km)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
12 yrs
2 yrs
Implement of 2008 economic stimulus plan
Approval of NEN Plan
Asian Financial Crisis broke out
Road law passed
Implementation of NTHS plan
123,500km
111,900
104,438
96,200
84,900
65,055
60,302
53,913
45,339
41,005
34,288
29,745
19,437
16,314
11,605
8,733
4,771
3,422
2,141
1,603
147 271 522 574 652
1988 89 90 91 92 93 94 95 96 97 98 99 2000 01 02 03 04 05 06 07 08 09 10 11 12 13 14 2015



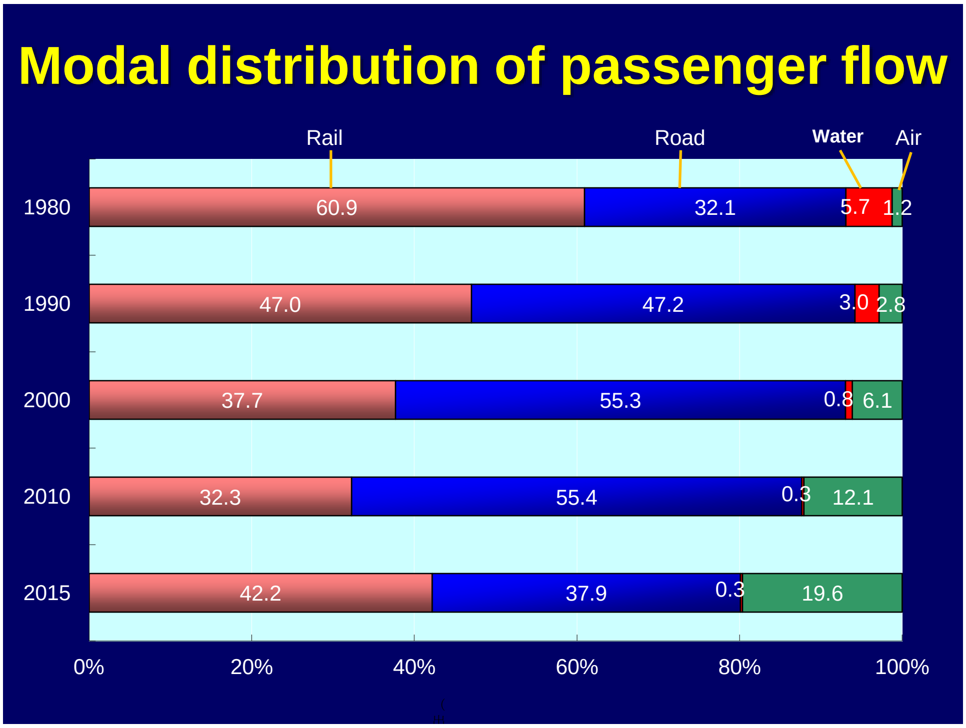
Rapid Motorization in China
(Unit : Million)
300
250
200
150
100
50
0
No of drivers
Potential market
No of cars
No of private cars
1990
1995
2000
2005
2010
2015

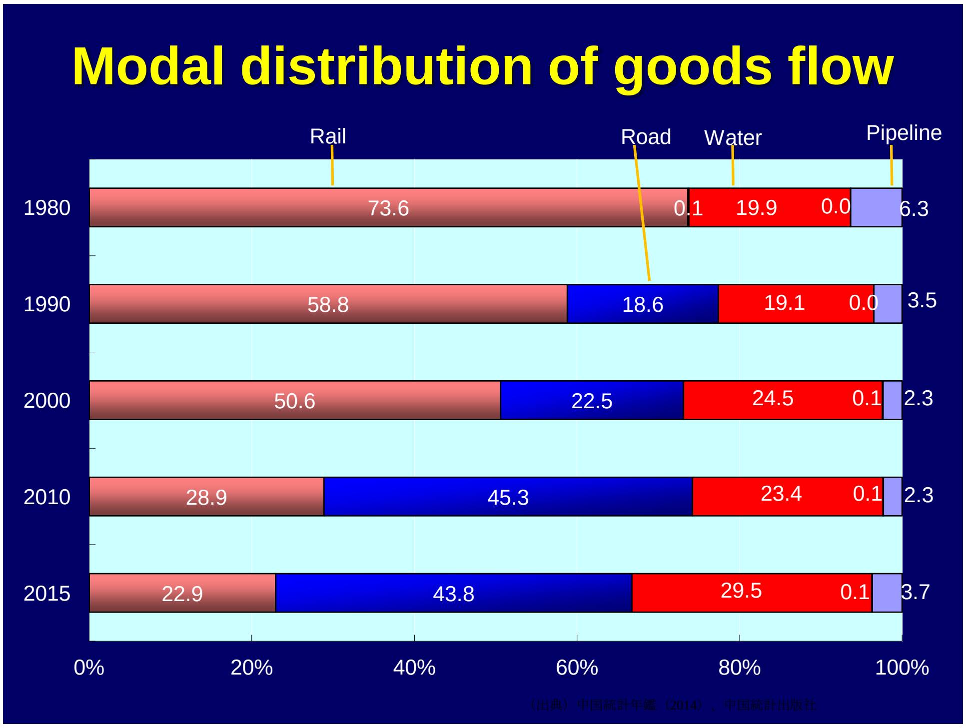
Growth rate of numbers of cars and drivers



Ref: HSR development in China

	HSR Operation mileage (km)	% of total railway mileage	HSR volume of passenger (10000)	% of railway passenger	HSR Passenger -km (100 million km)	% of total railway passenger -km	HSR average length of trip (km)
2008	672	0.8	734	0.5	15.6	0.2	212.5
2009	2699	3.2	4,651	3.1	162.2	2.1	348.7
2010	5,133	5.6	13,323	8.0	463.2	5.3	347.7
2011	6,601	7.1	28,552	15.8	1,058.4	11.0	370.7
2012	9,356	9.6	38,815	20.5	1,446.1	14.7	372.6
2013	11,028	10.7	52,962	25.1	2,141.1	20.2	404.3
2014	16,456	14.7	70,378	30.5	2,825.0	25.1	401.4
2015	19,838	16.4	96,139	37.9	3,863.4	32.3	401.9

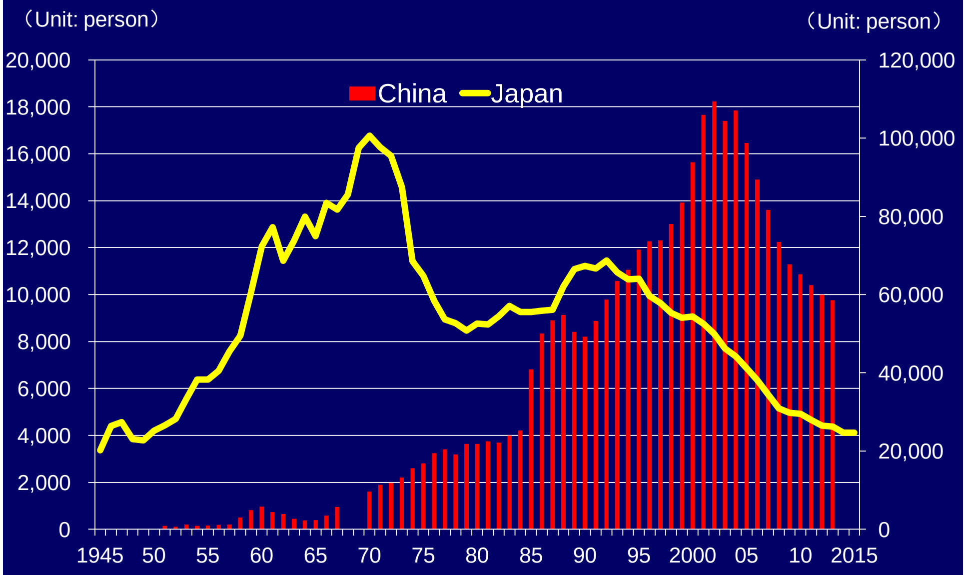

Modal distribution of passenger flow
Rail
Road
Water
Air
1980
60.9
32.1
5.7
1.2
1990
47.0
47.2
3.0
2.8
2000
37.7
55.3
0.8
6.1
2010
32.3
55.4
0.3
12.1
2015
42.2
37.9
0.3
19.6
0%
20%
40%
60%
80%
100%


Modal distribution of goods flow
Rail
Road
Water
Pipeline
1980
73.6
0.1
19.9
0.0
6.3
1990
58.8
18.6
19.1
0.0
3.5
2000
50.6
22.5
24.5
0.1
2.3
2010
28.9
45.3
23.4
0.1
2.3
2015
22.9
43.8
29.5
0.1
3.7
0%
20%
40%
60%
80%
100%

Issues caused by motorizations

- Traffic congestion
- Traffic accident
- Environmental problems
- Energy problems
- Urban sprawl
- Health issues
- Mobility problems
  - Private vs public transportations
  - Transportation poor

No of road traffic death (China vs Japan)



2. Traffic safety policies and regulations

Major reasons for traffic accidents (2015)

No of death: 58,022 (2015)

1	2	3	4
Motor vehicle	Non-motor vehicle	Pedestrians & passengers	Road & others
54,480(93.90%)	2,304(3.97%)	1,136(1.96%)	102(0.18%)

The top three violations of traffic laws and regulations for motor vehicle fatalities (2015)

1. Failing to yield
   5,940 (10.24%)
2. Speeding
   3,382 (5.83%)
3. Drunk driving
   2,600 (4.48%)

National organization with jurisdiction over traffic safety

- Ministry of Public Security
- Ministry of Transportation
- Ministry of Housing and Urban-Rural Development

→ National Inter-Ministry Joint Conference on road traffic safety (2003)

National Inter-Ministry Joint Conference

- analyze the current situations of traffic accidents
- develop medium and long term strategic safety plan
- propose and carry out countermeasures
- provide guidance and supervise the road safety work
- promote coordination among different agencies

Special issues concerning road traffic safety in China

Special issues

- Lack of safety awareness of road users
- Mixed traffic pattern and lack of traffic safety facility
- Overloaded and oversized trucks and unsafe vehicles
- Traffic accident analysis and data sharing

Traffic Safety Policies and Regulations in China

1986
Reform of Road Traffic Management Structure

1988
Road Traffic Management Regulations

1991
Disposition of Road Traffic Accidents

2003
Road Traffic Safety Law

Road Traffic Safety Law

- Strengthen the enforcement on drunk driving.
- Strengthen the enforcement on overloading.
- Driving with no driver’s license could result in less than 15 days’ custody.
- Motor vehicles have to reduce speed when crossing the crosswalk. When there are pedestrians crossing the streets, vehicles have to stop and yield to the pedestrians.

Road Traffic Safety Law

- Motor vehicle drivers should be responsible for the accidents involving motor vehicles and non-motorized vehicles or pedestrians.
- Hit-and-run will result in withdraw of driving license and the driver can never get the license again.
- The driving speed on freeways is not allowed to exceed 120 km/h.

Traffic Safety Campaigns

The Five Improvements and Three Enhancements

•2004, the Ministry of Public Security

Counties and Districts with Safe and Smooth Traffic

•2005, the Ministry of Public Security and the Ministry of Transportation

Enhancement of School Bus Safety

•2006, Ministry of Education and Ministry of Public Security

The Five Improvements and Three Enhancements

1. Improve the quality of training and education of drivers
2. Improve traffic management (dangerous chemical goods; severe weather or emergent events)
3. Improve the management of transportation corporations
4. Improve the management of corporations of motor vehicle production and reconfiguration
5. Improve the road conditions to reduce traffic accidents
6. Enhance the role of government agencies in promoting the traffic safety programs
7. Enhance traffic safety propaganda and education
8. Enhance traffic safety law enforcement

Counties and Districts with Safe and Smooth Traffic

1. Traffic management departments in public security agencies are the major forces. Their responsibilities include:
   - develop road traffic safety evaluation system and freeway surveillance system;
   - prevent severe road traffic accident, improve management of motor vehicles and drivers in the rural areas and so on.
2. Enhance the coordination and cooperation among different agencies.
3. Reinforce the education and propaganda of road traffic safety in the local counties and municipalities.

Enhancement of School Bus Safety

Emergent Notice of Examining School Buses in Primary and Middle Schools (2006) requires that：

1. A large-scale examination of school bus in primary and middle schools be carried out;
2. The qualification of the school bus drivers be examined and safety education be conducted to the drivers;
3. Safety education be carried out in schools;
4. Traffic violations be punished according to related laws and regulations.

3. Implications & suggestions for Thailand

Implications & suggestions for Thailand

- Low-tech measures such as mandatory seat belt usage or speed limit might be the most effective choices;
- Enforcement on drunk driving is important;
- Traffic safety facilities are necessary;
- Traffic safety education is fundamental;
- Improvement and share of traffic accidents database.
- ……

Fourth Speaker of <Session 1>

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Brief Biography:

Dr. Digvijay S. Pawar is Assistant Professor in Transportation Engineering in Department of Civil Engineering at Indian Institute of Technology (IIT) Hyderabad. He received his Masters and Doctoral degree in Civil Engineering from IIT Bombay, India in 2015.

His current areas of interest include: traffic safety and accident analysis, traffic operations, driver and pedestrian behavioral modeling, intelligent transportation systems and statistical modeling and classification techniques. His doctoral research focused on Performance evaluation and safety analysis of intersections and mid-block street crossings in India. He was awarded for Excellence in Thesis Work for the Year 2014-2016 for the outstanding research contributions from the Indian Institute of Technology Bombay.He has published in a number of leading journals, including Transportation Research Part C, Transportation Research Record, ASCE, Journal of Safety Research, Safety Science, and Transportation Letters. He is a reviewer for various national and international journals and conferences. Dr. Pawar is a member of professional societies such as the American Society of Civil Engineers (ASCE), Institute of Urban Transport-India (IUT-India), Indian Roads Congress (IRC).

Accident and Road Safety Management in India

By Asst.Prof.Dr.Digvijay S. PAWAR

Summary:

India has one of the highest motorization growth in the world accompanied by a rapid expansion in road network and urbanization. The country has been facing various issues and impacts on road safety level. The country is dedicated to reduce the number road crashes and related fatalities by 50% by 2020. The traffic on Indian urban and rural roads is heterogeneous, which is characterized by a) large variations in vehicle characteristics, b) absence of lane-based movements, c) aggressive driving, and d) weak enforcement of traffic rules. According to Ministry of Road Transport & Highways (MoRTH) the analysis of road accident data for the year 2015 revealed that about 1,374 accidents and 400 deaths take place every day on Indian roads which further translates into 57 accidents and loss of 17 lives on an average every hour in our country. As per the data recorded, drivers' fault has been revealed as the single most responsible factor for road accidents. Drivers' fault accounted for 77.1% of total road accidents during 2015 as against 78.8% during 2014. The report also revealed that about 49% of total accidents took place at traffic junctions in 2015 in which 31,807 (12.9%) road accidents were reported at signalized intersections. A total of 7,648 persons were reported dead and 29,987 people were reported injured in 2015. The drivers in India are reported to be aggressive in nature and due to lack of proper enforcement of traffic rules, the accident rate is increasing every year.

Road intersections are the primary bottlenecks in a given network; this is because the intersection space needs to be shared by the vehicles moving in different directions. An intersection has many crossing and merging conflicts points for vehicles. Additionally, pedestrians also usually cross roads at intersections, resulting in many more pedestrian vehicle conflicts points. The large number of vehicle to vehicle and vehicle to pedestrian conflicts are the potential cause of accidents at intersections. A better understanding of the driver/pedestrian behavior while crossing controlled and uncontrolled road sections, traffic characteristics and environmental factors that significantly contribute to increased crash risk will help guide the way to targeted design solution. There is a need to develop robust driver and pedestrian behavioral models based on a broad set of data collected at various locations, and to gain a better understanding of the true dynamics of drivers and pedestrians at signalized/unsignalized intersections and mid-block locations. To fulfil this need, this study developed enhanced behavioral models for gap acceptance behavior and dilemma behavior at unsignalized and signalized intersections based on empirical observations at intersections and mid-block pedestrian crossings.

10th International Annual Conference on “Transportation for a Better Life: Mobility and Road Safety Managements”

Accident and Road Safety Management in India

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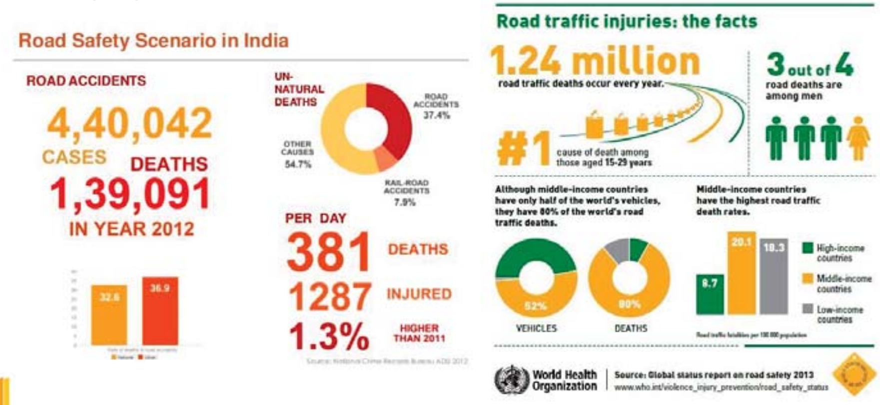
Indian Institute of Technology Hyderabad

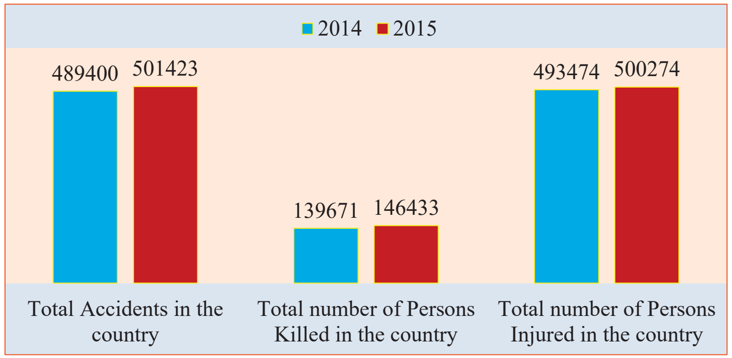
Road Crashes Statistics

- 8 % increase in number of India's road accidents every consecutive year
- If rate continues, 2.6 lakh deaths by 2030
- 15-29 age group most vulnerable



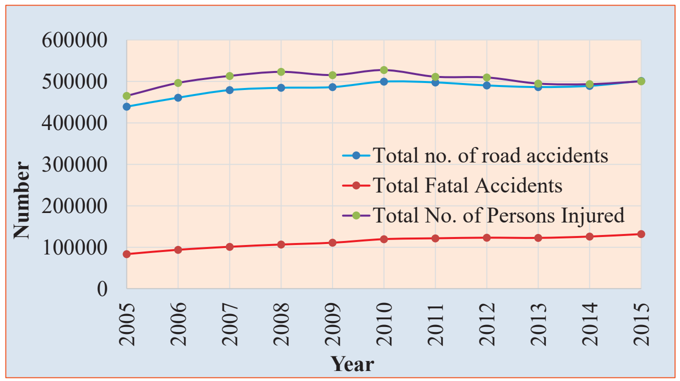
A comparative road accident scenario of 2014 and 2015

- The total number of road accidents increased by 2.5% in 2015 compared to 2014
- The total number of persons killed increased by 4.6%
- The analysis of road accident data 2015 reveals that about 1374 accidents and 400 deaths take place every day on Indian roads

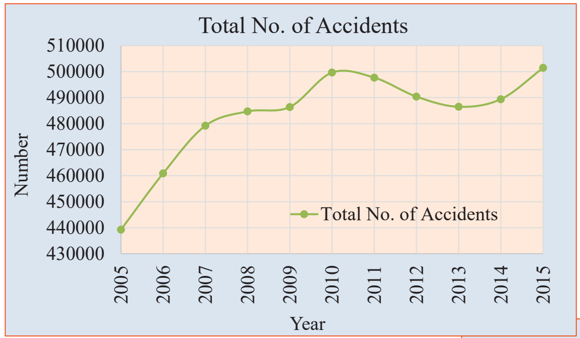


Road Accidents from 2005 to 2015

- During 2015, a total of 5,01,423 road accidents were reported by all States/Union Territories
- Of all 26.3 % were fatal accidents
- On an average of one fatality per 3.4 accidents

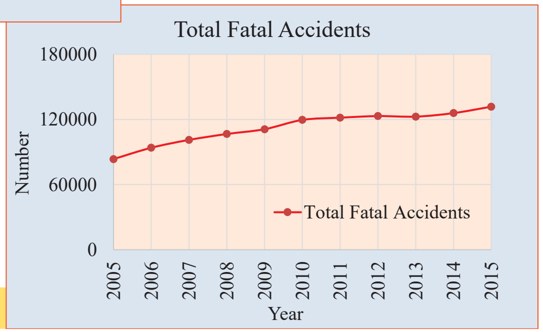


Road Accidents from 2005 to 2015



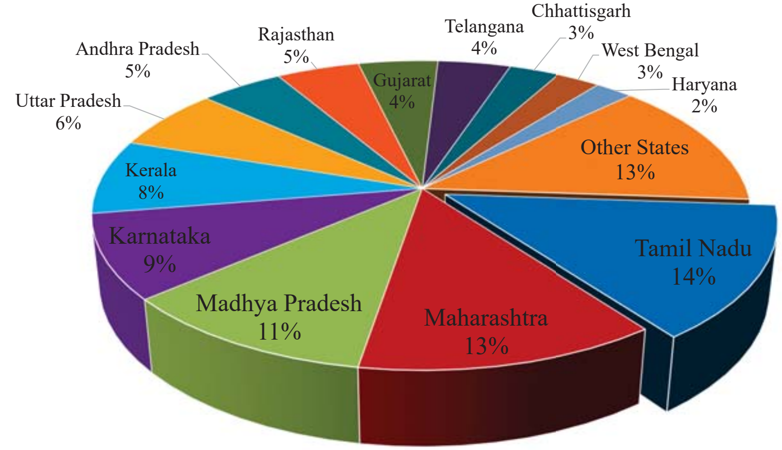
The total number of road accident have been increased alarmingly over the years 2005 to 2015

The proportion of fatal accidents in total road accidents has consistently increased since 2005 from 19.0% to 26.3% in 2015



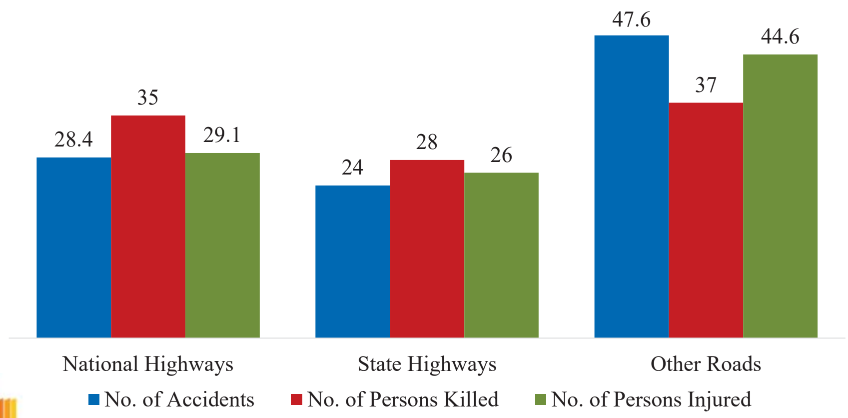
Number of Road Accidents in Different States

- Top 13 States according to their respective shares in 2015.
- Tamil Nadu reported the highest number of road accidents in 2015.



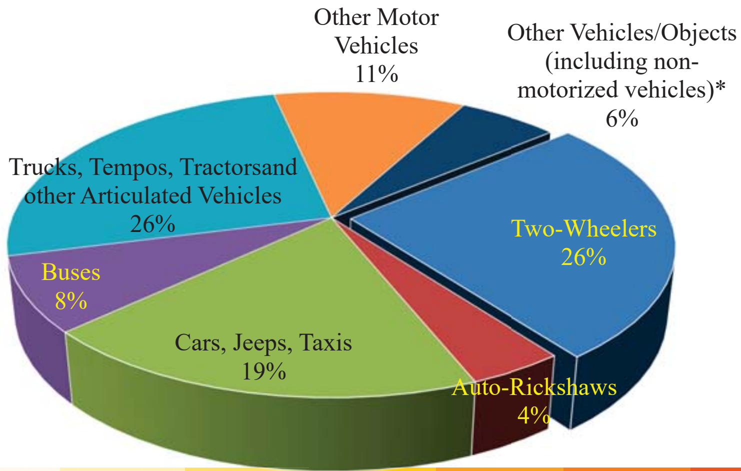
Percentage Share in Terms of Classification of Roads

- National Highways accounted for a share of 28.4% in total road accidents and 35.0% in total number of persons killed in road accidents during 2015.



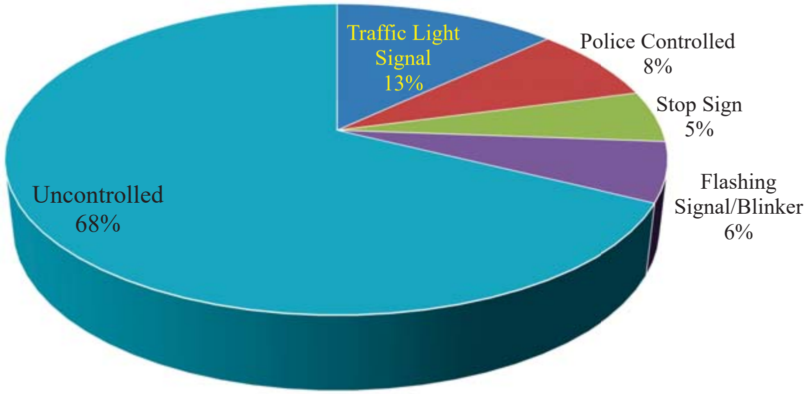
Fatal Accidents: vehicle share wise, 2015

- Motorized vehicles accounted for 95.5% of the total road accidents
- Two-wheelers accounted for the highest share in total road accidents (28.8 %) in 2015

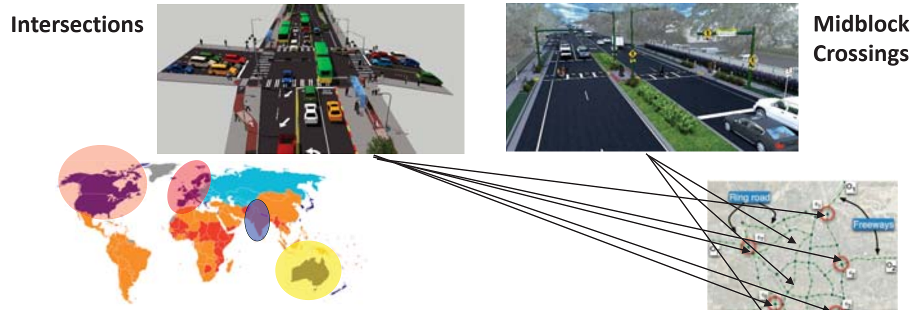


Total Number of Road Accidents

- Total Number of Road Accidents at various Traffic Controlled areas
- Maximum number of accidents occurred at uncontrolled areas with total 67.6%



Modeling driver interactions at intersection



- **In India :**
  - Very few intersections and midblock crossings have stop or yield signs
  - Drivers and pedestrians are aggressive and often the indicated priorities are not followed
  - Drivers and pedestrians perceive limited priority based on the existing geometric and traffic characteristics

Data Collection and Extraction

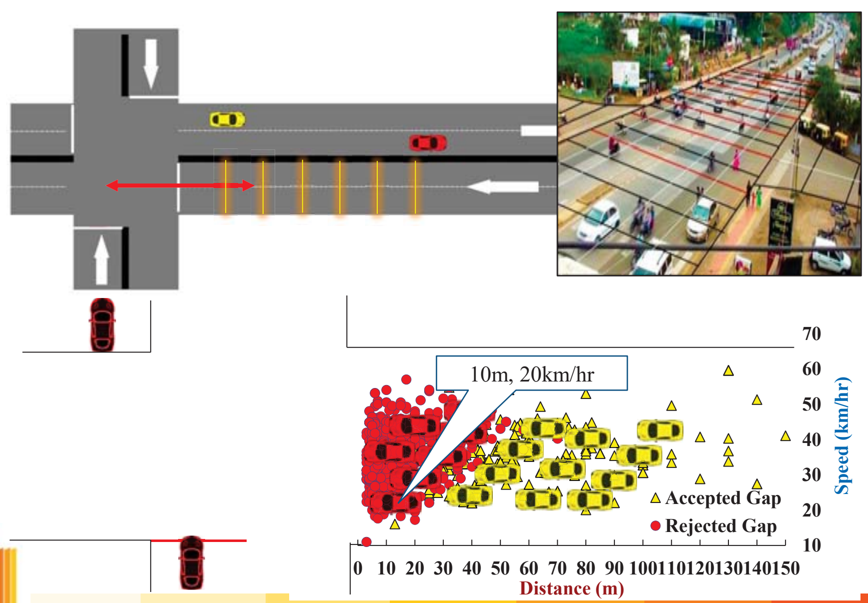
Selection of Intersections → Classification of Intersections → Collection of Data at Intersections → Data Extraction → Preliminary Data Analysis

- **Various data that are extracted from the video include:**
  - Time of vehicles at different cross grid-lines along the path: used to find vehicle speed at different locations
  - Classified traffic count: car, truck/bus, two-wheeler, and auto-rickshaw
  - Vehicle trajectories
  - Pedestrian trajectories
  - Conflict points at intersection area

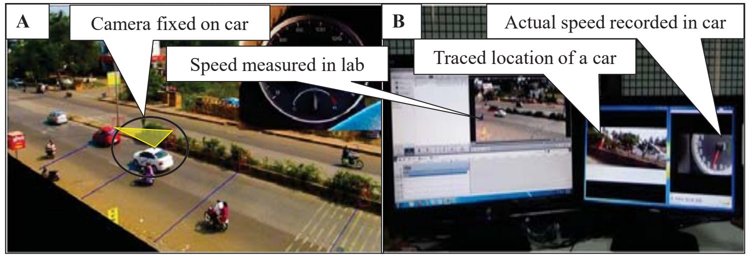
  (for Type I and Type II)

Data Collection

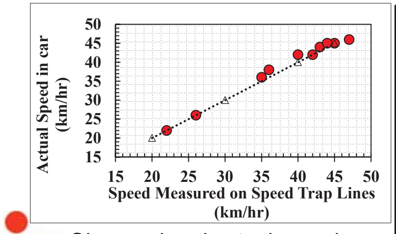
Data Extraction: Gap Acceptance & Dilemma Zone



Data : Speed Validation



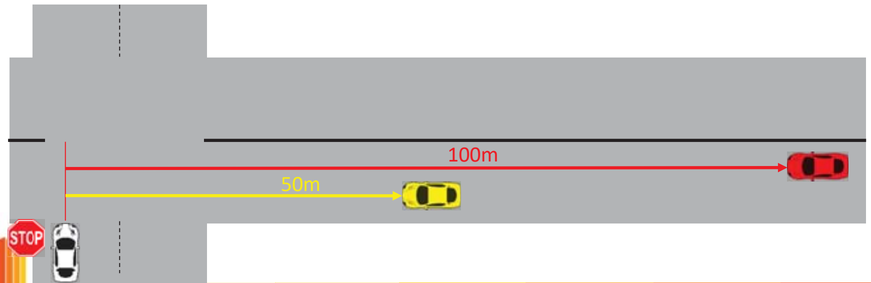
(A) Data collection and (B) Extraction process for validating speed data with different views from camera synchronized



Observed and actual speed measurement

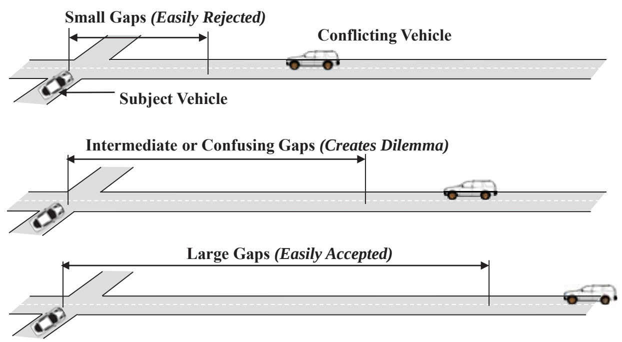
Why Spatial Gaps?

- 71% Drivers consider distance of approaching vehicle to perceive the gap
- Speed of approaching vehicle is another important parameter that driver perceives (60% Drivers)
- Time integrates both speed and distance
  - But fails to explain the effect of each of the individual parameter i.e. speed and distance



Dilemma Zone

- Drivers on a minor approach at an unsignalized intersection are under risk because of the difficulty in judging the safe available gaps
- Drivers clear about rejecting small gaps and accepting large gaps
- For certain range of gaps drivers' have dilemma
- Similar behaviour is observed for the pedestrians at uncontrolled midblock crossings

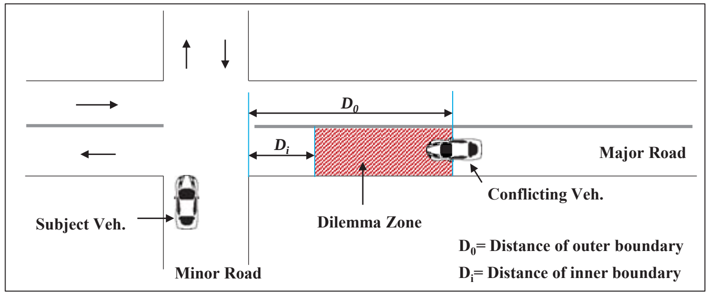


Accidents at Intersections

- Misjudgment may result in collision with major stream vehicles

Dilemma Zone

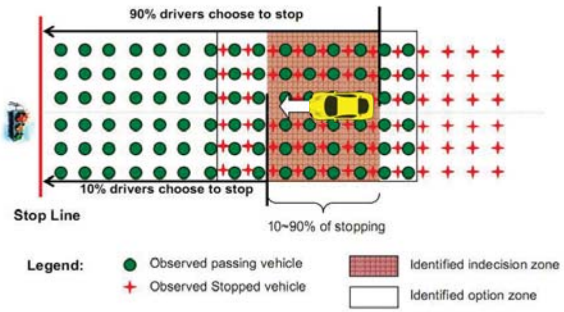
- Definition: “Dilemma zone” is a roadway segment of major road, over which if a vehicle is present creates dilemma to minor road vehicle regarding maneuvering
- When a conflicting vehicle is in this zone, minor road vehicles may take incorrect decision, and this unsafe behaviour may lead to crashes at intersection



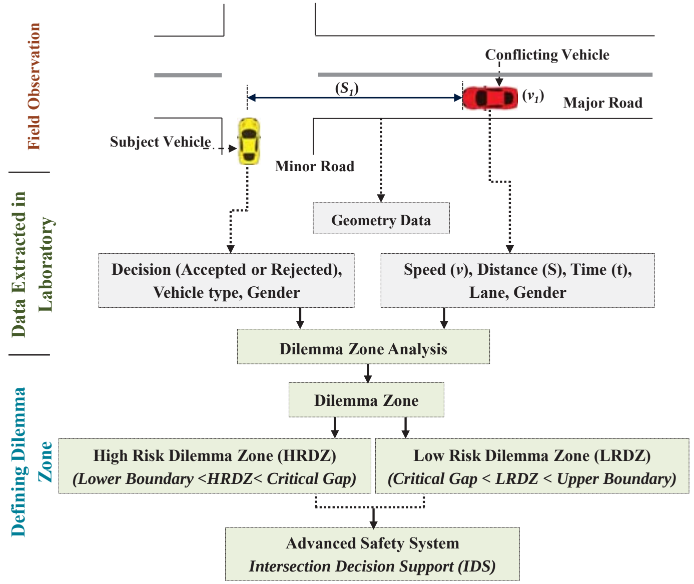
Physical location of dilemma zone on major road approaching intersection

Dilemma Zone Analysis

- Signalised Intersection: Zegeer (1977) defined a dilemma zone as “the road segment where more than 10% and less than 90% of the drivers would choose to stop.” : Probabilistic Approach
- Unsignalised Intersection: Dilemma zone is modeled as the road segment or a zone where more than 10% and less than 90% of the drivers would choose to reject the gap

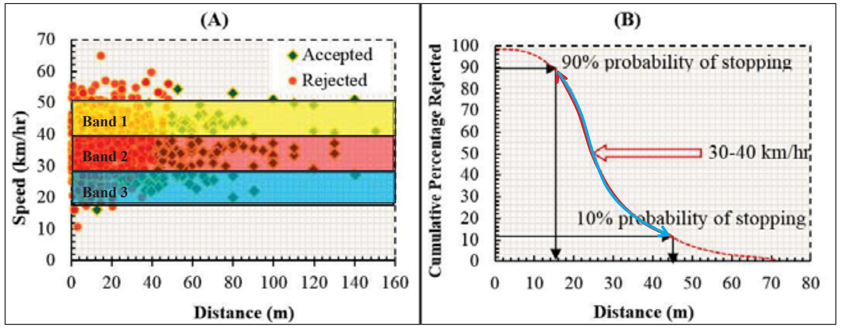


Dilemma Zone Analysis



Probabilistic Approach

- *Step 1: Classification of speed bands*
- *Step 2 : Determination of 10th and 90th percentile rejected gaps for speed classification of 20-30, 30-40, and 40-50 km/hr*



Probabilistic Approach

- Researchers initially used frequency-based approach to obtain the probability of stopping for Signalised Intersection
- Frequency-based methods resulted into significant variation in the dilemma zone boundaries
- Binary discrete choice models were proposed to determine the probability of stopping

  {Sheffi and Mahamassami (1981), Chang et al. (1985), Gates et al. (2007), Papaioannou (2007), Wonchul et al. (2008), Sharma et al. (2011)}

- Better understanding of the underlying human decision models and explain the variation in the observed dilemma zone boundaries

Definitions of Dummy Variables

Dummy Variables	Definition		% observation with value 1
	0	1	
Gender of subject Vehicle driver	Female	Male	85%
Whether Lag or Gap	Gap	Lag	21%
Position of conflicting vehicle	Lane1	Lane2	19.6%
Conflicting vehicle: Two-Wheeler	No	Yes	42%
Conflicting vehicle: Auto Rickshaw	No	Yes	8%
Conflicting vehicle: Car	No	Yes	34%
Conflicting vehicle: Truck	No	Yes	11%
Subject vehicle: two-wheeler	No	Yes	71%
Subject vehicle: Auto Rickshaw	No	Yes	11%
Subject vehicle: Car	No	Yes	17%
Subject vehicle: Truck	No	Yes	1%

Parameter Estimates and Statistical Significance

Variable	Description	4-legged intersection		3-legged intersection (Day)		3-legged intersection (Night)	
		Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constant	Constant	-0.814	-1.369	-0.642	-1.534	-0.669	-1.421
S	Speed	-0.155	-14.841	-0.063	-9.006	-0.982	-8.240
D	Distance	0.172	7.820	0.058	17.500	0.067	15.429
McFadden R^2		0.70		0.58		0.58	

The inner boundary, D_i

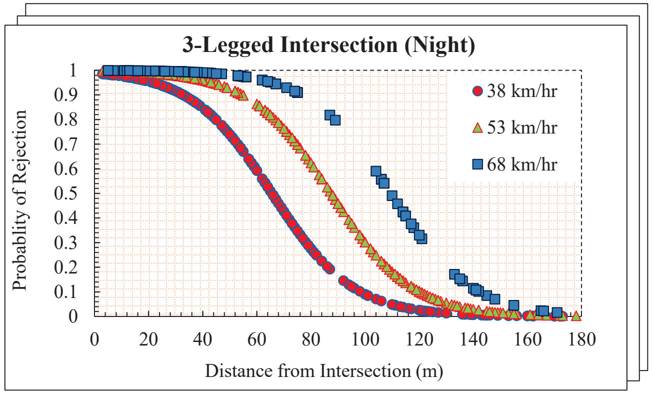
$$P_k(i) = 0.9 = \frac{1}{1 + e^{-(-0.814 - 0.155(S_k) + 0.172(D_i))}}$$

The outer boundary, D_0

$$P_k(i) = 0.1 = \frac{1}{1 + e^{-(-0.814 - 0.155(S_k) + 0.172(D_0))}}$$

Dilemma-zone curves

- Dilemma-zone curves for speed dependent models



Dilemma Zone Boundaries

Dilemma Zone Boundaries from Intersection for Probability of 10% and 90% Stopping for Different Cases

Approach Speed (km/hr)	4-legged intersection	
	90%	10%
25	14	40
35	23	48
45	32	58
Approach Speed (km/hr)	3-legged intersection Day	
	90%	10%
50	28	104
70	50	124
90	72	150
Approach Speed (km/hr)	3-legged intersection Night	
	90%	10%
38	32	98
53	52	118
68	76	140

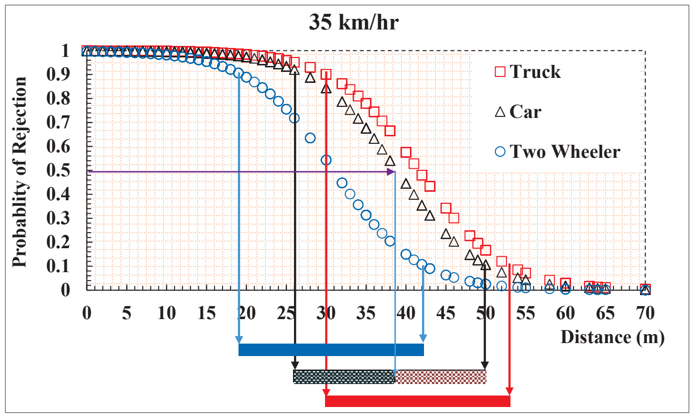
Effect of Vehicle Type on Dilemma Zone Boundaries

Model Variables and Parameter Estimation of the Logit Model for Selected Intersections

Variable	Description	4-legged intersection		3-legged intersection (Day)		3-legged intersection (Night)	
		Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constant	Constant	-3.23	-3.188	-1.504	-2.413	-0.452	-0.876
S	Speed	-0.074	-4.138	-0.054	-6.514	-0.083	-6.378
D	Distance	0.107	10.908	0.063	17.165	0.065	15.555
T	Truck	-1.323	-2.148	-1.027	-2.565	-1.769	-5.234
C	Car	-0.801	-1.393	-0.539	-1.332	-0.541	-1.654
TW	Two Wheeler	0.719	1.301	0.534	1.476	-	-
McFadden R^2		0.70		0.58		0.58	

Effect of Vehicle Type on Dilemma Zone Boundaries

- For two wheeler: downstream boundary of dilemma zone lies close to the intersection while for truck it lies away from the intersection
- Subject vehicles sense more danger if conflicting vehicle is truck due to its larger size and hence wait for longer safe gaps

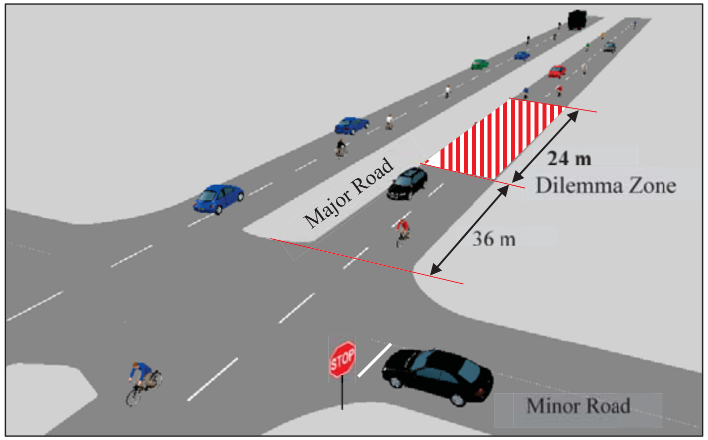


Dilemma Zone Boundaries for Different Vehicle Types

Intersection	Approach Speed (km/hr)	Truck 90%	Truck 10%	Car 90%	Car 10%	TW 90%	TW 10%
4-legged intersection	25	20	42	18	40	10	32
	35	30	52	28	50	18	42
	45	40	62	36	60	28	52
3-legged intersection (Day)	50	44	116	40	108	20	92
	70	64	136	52	128	40	108
	90	80	148	70	144	54	128
3-legged intersection (Night)	38	48	116	28	100	12	76
	53	64	136	48	116	24	96
	68	88	146	68	138	44	122

Actual location of Dilemma Zone

- Graphical illustration of dilemma zone on major road at uncontrolled intersection

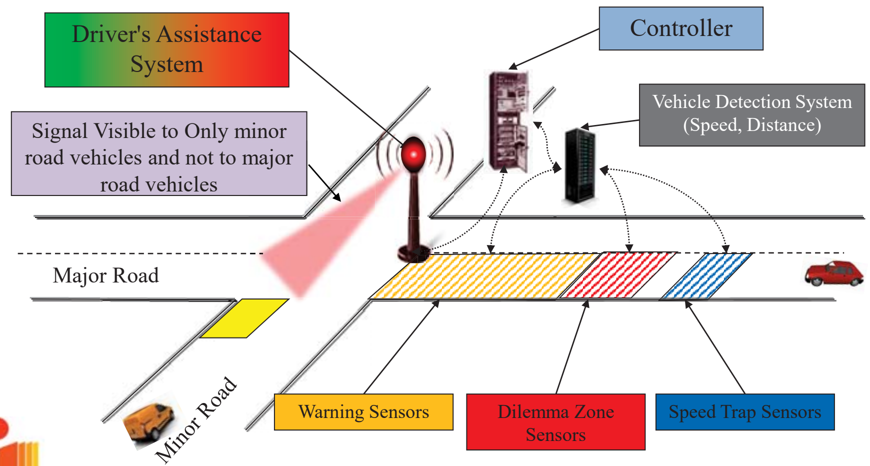


Summary and Conclusions: Dilemma Zone for Low Priority Streams

- The dilemma zone boundary values are found using probabilistic approach which models dilemma zone as a road segment or a zone where more than 10 % and less than 90 % of the observed gaps are rejected
- The dilemma zone boundary values are found to vary with conflicting vehicle type and time of the day
- Start and end point of dilemma zone for medium speed intersection for different conditions varies from 10 to 40 m and 32 to 62 m
- For High speed intersection these values vary from 12 to 88 and 76 to 148 m
- Dilemma zone due to truck extends approx. 10 m farther upstream than two wheeler dilemma zone for medium speed intersection and approx. 20 m for high speed intersection

Potential Application

- Developing an advanced vehicle warning and safety system that will alert the drivers when major road vehicle is at critical distance



Objective 2

- Analyze response of major road drivers to aggressive maneuvering of the minor road drivers at uncontrolled intersections using driving simulator

Methodology

- Experiment conducted using driving simulator located in advanced traffic engineering laboratory at IIT Bombay
- It is a fully instrumented open cockpit vehicle cab with all its driver controls in fully operational condition

FIGURE Fully instrumented open cockpit fixed-base driving simulator with triple-monitor setup

Scenario Design

- Designed driving route comprised of simulated route in semi urban area with four lane undivided major road
- Simulated route : 10.4 km long with nine stop-controlled intersections each placed at a distance of 700 m

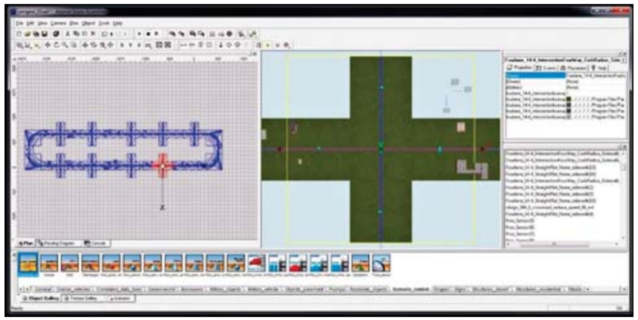


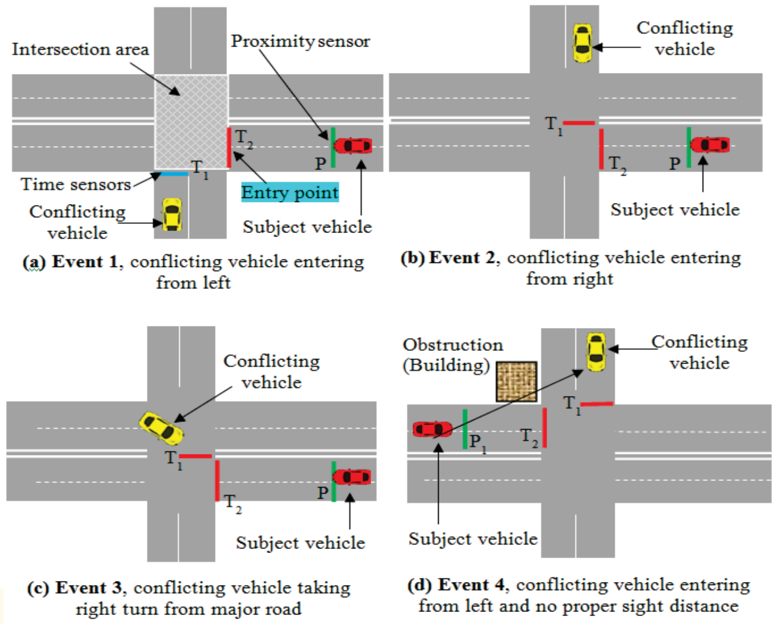
FIGURE Scenario design in SimVista

Participants

- 51 drivers participated in the driving task
- Of all the drivers 19 drivers were professional drivers who were working as full time drivers with an average mileage of 60 km/day
- The participants having driving experience of at least 1 year with valid license were considered for driving simulator test
- The age of participants ranged from 21 to 49 years with a median of 27 years and standard deviation of 5.7 years

Events

FIGURE 3Sketch of simulator experiment with different events.



Calculation of Response Time before Possible Conflict (RTPC)

- RTPC is calculated by taking the difference of times when subject vehicle applies the brakes and conflicting vehicle crosses the time sensor T_1. i.e., $RTPC = t_1 - t_b$

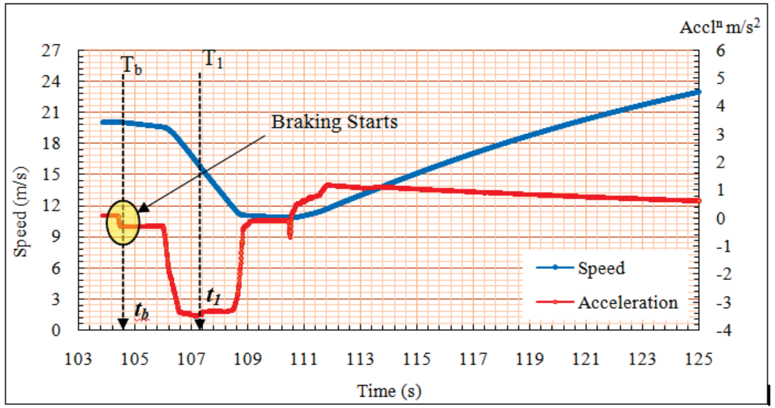
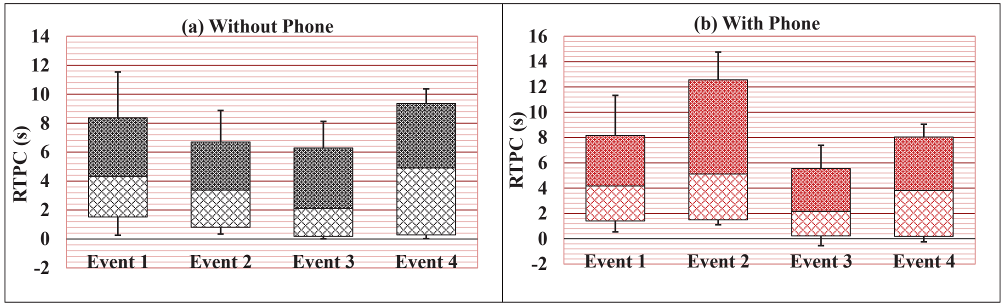
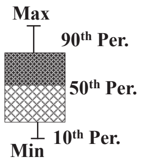


FIGURE Sketch of simulator experiment with different events

Results

- Distribution of brake response time to conflict when subject vehicle drivers are without phone and with phone respectively





Results

TABLE 10th, 50th, 85th and 90th percentile RTPC

Speeds	Without Phone				With Phone			
	Event 1	Event 2	Event 3	Event 4	Event 1	Event 2	Event 3	Event 4
10th Percentile	1.53	0.82	0.18	0.28	1.41	1.50	0.23	0.19
50th Percentile	3.80	2.80	1.32	5.43	3.59	3.63	2.15	3.76
85th Percentile	7.90	6.10	4.83	8.58	7.88	12.05	4.15	7.27
90th Percentile	8.38	6.70	6.29	9.36	8.17	12.57	5.55	8.04

Distribution of speeds

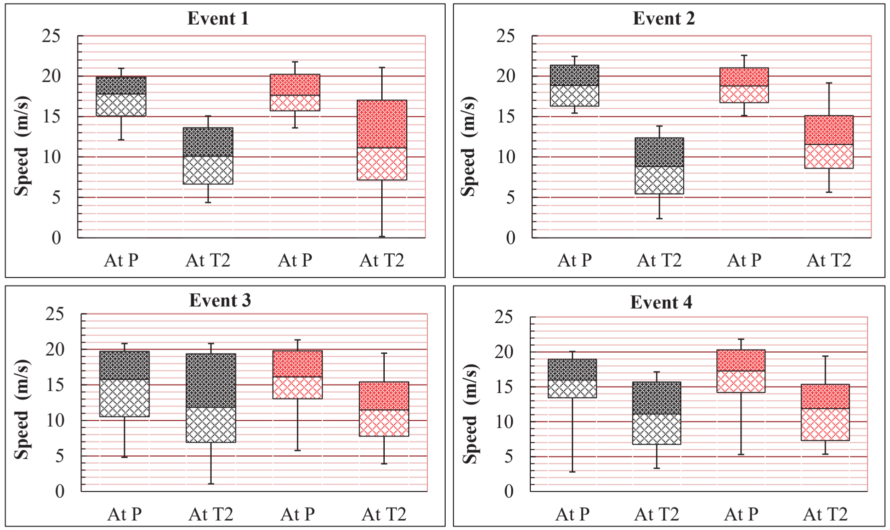


FIGURE Distribution of speeds for all drivers for different events

Typical driver's speed profile

- The drivers were found to behave differently for each case.
- For all events, the differences in the approaching speeds for all the drivers was statically significant ($F = 339.85$, $p < 0.001$ for Event 1)

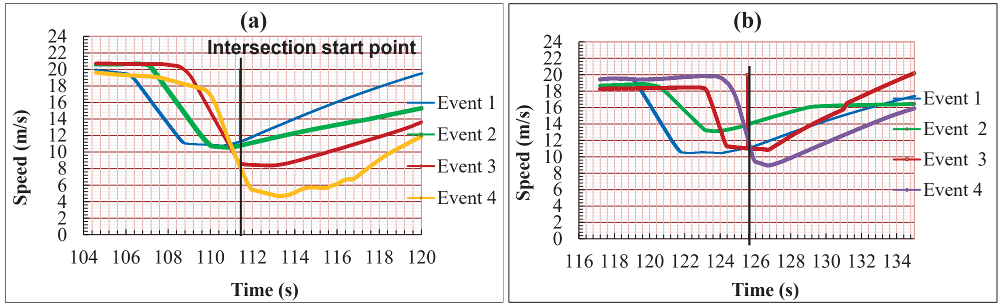
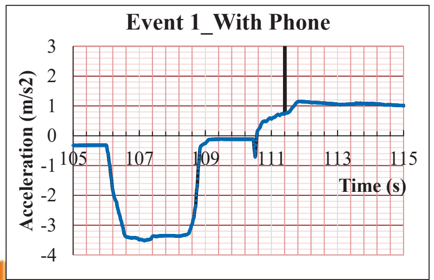
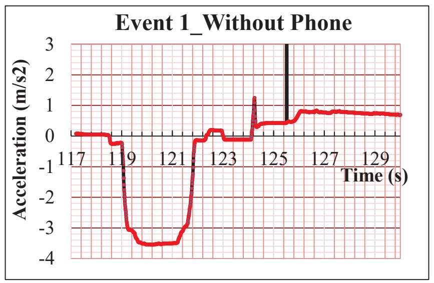


FIGURE A typical driver's speed profile for different events (a) when driver is without phone (b) when driver is with phone.

Deceleration Rate

- Deceleration is the evasive action taken by the subject vehicle to avoid the collision
- Average decelerating rate was found to be 3.73 m/s^2 and 4.47 m/s^2 when the participants are driving without phone and with phone respectively
- 85th percentile deceleration value for different events ranged from 4.5 to 6.9 and 5.3 to 7.3 m/s^2 for without phone and with phone condition respectively





Discussion

- Study also analyzed the speed and deceleration profile for all participants while approaching an intersection
- Four different events were created using driving simulator software
- Study focused on understanding and analyzing the major road vehicle braking behavior, which in turn was used to analyze the RTPC
- The RTPC was calculated with reference to the time at entry of the minor road vehicle and application of brakes by the major road vehicle in order to avoid the collision

Discussion

- The minimum and maximum RTPC values were found to vary from **0.01 to 11.5 sec** for all the events without having conversation on phone
- RTPC values were found to vary from **− 0.7 to 14.8 sec** for all the events when drivers are engaged in phone conversation
- High value of RTPC indicates conservative behavior of the driver, low value indicates aggressive behavior or inattention of the driver
- Negative values are reported when participants were engaged in phone conversation, which indicates that participant drivers failed to identify conflicting vehicle and avoid collision at the intersection
- Near zero values indicated collision at the intersection. The maximum number of collisions were reported in case of event 3

Thank You

Questions? Comments?

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Fifth Speaker of <Session 1>

Prof. Dr. Pichai Taneerananon
Professor, Graduate School
Prince of Songkla University
E-mail: 2007tao@gmail.com

Brief Biography:

***Membership in Professional Societies**:*
-Professional Engineer (registered with the Royal Thai Government)
-Member of the Engineering Institute of Thailand
-Board member of ATRAN
-Board member of Knowledge Center for road Safety
-Senior road safety auditor accredited in Australia.
-Member of Road Association of Thailand
-Founding Member of Thai Society for Traffic and Transportation Studies
-President of Thai Society for Traffic and Transportation Studies
-Current First Vice President of EASTS

Key Qualifications: Dr Taneerananon has been a full time academic at Prince of Songkla University for over 35 years, until 2015; he is currently an Adjunct Professor with the Graduate School, supervising PhD students. His major research area is in road safety in Thailand where he continues to be involved with government mission to reduce road fatalities. He has conducted research under the guidance of Professor Shigeru Morichi in Intercity rail transport in Asia and Urban rail transport in Bangkok over the past few years.

Education:

1969-1972	*B.E. (Second Class Honours Division A) Civil Engineering, University of Western Australia. Holder of Australian Government's Colombo Plan Scholarship*
1975-1976	*M.Eng.Sc. (Highway and Transportation Engineering) University of New South Wales. Holder of UNSW University Postgraduate Fellowship in Highway Engineering.*
1977-1981	*Ph.D.(Civil Engineering) University of New South Wales. Holder of UNSW University Postgraduate Scholarship.*

Accident and Road Safety Managements in Thailand

By Prof. Dr. Pichai Taneerananon

Summary:

Thailand road death statistics have been the subject of ongoing debate. The issue is no one really knows exactly how many people are killed on our road annually, the police data is somewhere below the 10,000 deaths, while the Ministry of Public Health data is also above 20,000. So it is perhaps best to use the WHO data of some 24000 annual deaths which ranks Thailand as the second most dangerous country in the world in terms of road crashes with the fatality rate of 36.2 deaths per a 100,000 population.

The WHO and World Bank published a landmark on road crashes: World Report on Road Traffic Injury Prevention in 2004. It made six strong recommendations to help countries improve their safety performance:

1. Identify a lead agency in government to guide the national road safety effort.

2. Assess the problem, policies and institutional settings relating to road traffic injury and the capacity for road traffic injury prevention in each country.

3. Prepare a national road safety strategy and plan of action.

4. Allocate financial and human resources to address the problem.

5. Implement specific actions to prevent road traffic crashes, minimize injuries and their consequences and evaluate the impact of these actions.

6. Support the development of national capacity and international cooperation.

Thailand has implemented all of the recommendations to various extents. The big question begging for answers is why our road deaths have shown little sign of improvement? The talk will focus on weakness and strength of the country's safety management system including the fundamental role of the lead agency which is to ensuring the effective and efficient functioning of the road safety management system; and discuss the safe system approach to improve road safety in Thailand.

10th International Annual Conference on
"Transportation for a Better Life:
Mobility and Road Safety Managements"

Road Safety Management &

Safe System Approach

18.8.2017

Radisson Blu Plaza Hotel, Bangkok

Professor Dr Pichai Taneerananon

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Outline

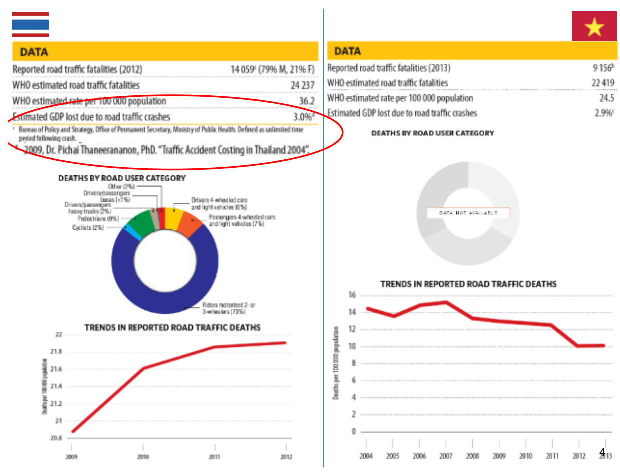
- Introduction
- Road Safety Management
- The Safe System Approach:
- The Need for Actions
- Conclusions

2

The Immense Loss

- Over 3400 die daily globally
- Over 65 daily deaths on Thai roads
- (~ 24000 killed on our roads, annually)

3



4

Immense Costs of Road Crashes

Estimated Economic cost to
the nation 3% GDP (World Bank)
Thailand 2015 GDP 395.3 Billion Dollars

= 0.03 x 395300 x 35 = 415,065 Million Baht

~ 500,000 Million B

5

What is Management ?

- **Management is doing things right**

Peter Drucker

The Big Question ?

- Where is the needed management in this country ?

Outline

- Introduction
- Road Safety Management
- The Safe System Approach:
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- Conclusions

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Road Safety Management

- Road crash is a system problem requiring..
  Systematic response
- Managing for improved road safety results must..
- Address three inter-related elements of the road safety management system:
  - institutional management functions,
  - interventions and
  - results
- The weakness of the lead agency is big challenge

Outline

- Introduction
- Road Safety Management
- The Safe System Approach:
- The Need for Actions
- Conclusions

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In 1997, the Swedish parliament passed the Road Traffic Safety Bill founded on Vision Zero.

The legislation is based on four principles:

1. **human life and health are paramount** and take priority over mobility and other objectives of the road traffic system;

2. providers and regulators of the road traffic system share responsibility with drivers and other users;

11

3. road traffic systems should take account of human fallibility and minimize both the opportunities for errors and the harm done when they occur; and

4. providers and regulators must do their utmost to guarantee the safety of all citizens and cooperate with road users, and all three must be ready to change to achieve safety.

12

The Safe System Approach

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

30 member countries are: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom and USA

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The Safe System Approach

- A Safe System approach addresses all elements of the road transport system to ensure that road users are never subject to impact energy levels sufficient to cause fatal or serious injury when errors of judgment result in crashes.
- This includes forgiving infrastructure design, pursuit of improved vehicle safety and review of speed limits to better manage crash energy

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The Safe System Approach

- It assigns a responsibility to ensure compliance with safe system design to all parties involved in designing and managing vehicles and the road environment and traffic
- not just to road users and police !

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The Safe System Approach

Assume..

- Competent and compliant drivers/riders
- If they are not competent, the system will help train the drivers and ensure they are

Allow…

Drivers, pedestrians to make errors and accommodate these in the road & vehicle design

ENGINEERS Accept..

Responsibility to do the utmost to save lives of road users

16

Focus on 3 elements

- Safe roads and roadsides
  - Safe Design, maintenance and operation thru RSA
- Safe vehicle
  - Ensure vehicles have good crash rating (EURONCAP), safety and protective equipment (ESC, air bags, etc.)
  - But what to do about motorcycle ?
- Safe speed
  - Ensure impact speed does not cause death/serious injury

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18

Can this be called a forgiving road infrastructure ?

19

Outline

- Introduction
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The Need to Act !

- Traditional way…100 % Helmet, tougher enforcement etc. and
- We are left with some 24000 annual deaths

OR

- A paradigm shift to new thinking

21

Decade of Action for Road Safety

Need to review capacity of our road safety management system Now !

The Role of Lead Agency is crucial

Adopt the safe system approach Now!

22

Chain of Events

Knowing that one defective element can lead to a crash :

H : Human Errors

I : Infrastructure Defects

V : Vehicle Defects

23

A fatal crash, a human error was made

5 Navy officers killed Surat thani 6.7.15

24

The system fails to provide a safe median

Unsafe System could not protect errant driver

Road Safety Audit

- The philosophy

Prevention is better than cure

第六十四章

其安易持，其未兆易謀。其脆易泮，其微易散。為之於未有，治之於未亂。合抱之木，生於毫末；九層之台，起於累土；千里之行，始於足下。為者敗之，執者失之。是以聖人無為故無敗，無執故無失。民之從事，常於幾成而敗之。慎終如始，則無敗事。是以聖人欲不欲，不貴難得之貨；學不學，復眾人之所過。以輔萬物之自然，而不敢為。

These people could die trying to cross the highway,

Safe Infrastructure

Could save hundreds of lives

- Case 1 : Van vs. Truck

Crash Scene Investigation

ความเสียหายของอุบัติเหตุ

(ความสูญเสีย : รถตู้)

	เสียชีวิต	บาดเจ็บ	
1. มีผู้โดยสารมาทั้งหมด 21 คน			
• นักเรียนอายุประมาณ 12 ปี : 18 คน	7	3	8 ราย
• อาจารย์ผู้ควบคุม : 2 คน	-		
• คนขับรถ : 1 คน	1		

(ความสูญเสีย : รถบรรทุก 6 ล้อ)

	บาดเจ็บหนัก
2. คนขับรถ : 1 คน	1

จุดเริ่มและสิ้นสุดทางเบี่ยง

ถนนระหว่างการก่อสร้าง

Actions by DLT, DOH, DORR, OTP

As system designers/providers/regulators/ planner

DOH, DORR, EXAT, BMA are duty-bound to take actions to save lives

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Decade of Action for Road Safety

We need to ACT !

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The Most vulnerable road users

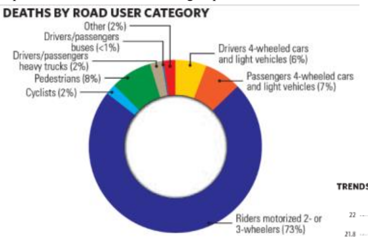
73 % MC ~ annual 20,000 deaths

40

THAILAND

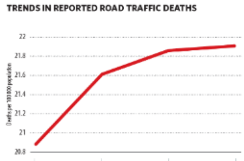
Population: 67 010 502 • Income group: Middle • Gross national income per capita: US$ 5 340

DEATHS BY ROAD USER CATEGORY



Source: Injury Surveillance System (data from 2012).

TRENDS IN REPORTED ROAD TRAFFIC DEATHS



Source: Bureau of Policy and Strategy, Office of Permanent Secretary, Ministry of Public Health.

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The Helmet Act

- Since 1994,
- Bkk 2017

42

The 100% Helmet wearing campaign

- From 44% to 46%

- Riders 53% to 54%
- Pax 19% to 24%

source : Thai Road

43

A Faulty design (providing a front basket) that has probably killed thousands

44

Faulty MC design can encourage non-helmet wearing

45

By inadvertently encouraging riders not to wear helmet

46

We must act !

- We can not depend on the Police alone to reduce traffic deaths/injuries

We must and can do more to save lives

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We need MC lane, an Engineering SOLUTION

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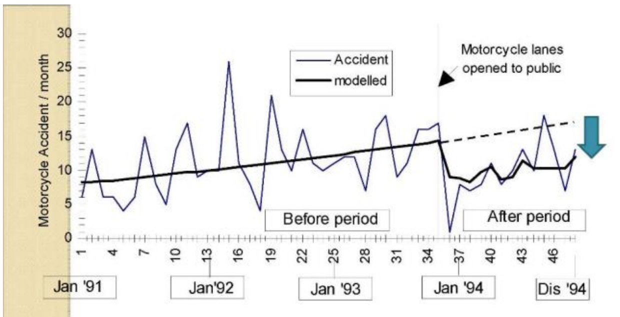
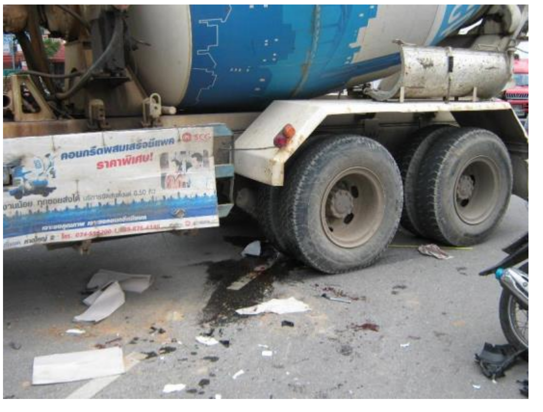


- 39% less Accidents
- 83% less Fatality
- Benefit:Cost = 5

Source: Radin Umar MIROS

Because a small error can mean death



Motorcycle exclusive lane in Taipei, Taiwan

An Equity as much as Safety issue

Enough pavement for MC lane

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Too many MC lanes !

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Outline

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Conclusions

With some 24,000 annual deaths on our roads, urgent actions are needed

The first thing is to get our lead agency working

Urgent need to adopt the Safe System Approach to cut down road deaths and injuries

Provision of motorcycle lane will save thousands of lives

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No one is safe until the System is safe !

<AFTERNOON SESSION >

< 1st AFTERNOON SESSION >

Session 2: Parallel Session of Main Annual Conference (Symposium)
and
ATRANS Young Researcher's Forum Session

Session 2A "Transport Safety"
Moderated by Prof.Dr. Atsushi Fukuda, Nihon University, Japan
V2X Development for Road Safety in Japan and Its Trial for V2M in Taiwan By Dr.Yoshiharu DOI and Dr. Chang-Yi LUO, Toyota InfoTechnology Center Co., Ltd., Japan
Road Accidents and Awareness raising through Public Participatory Approach in Japan By Prof. Dr. Satoru KOBAYAKAWA Dept. of Transportation Systems Engineering, Nihon University, Japan
Policy Implication and Practical Approach of Road Safety in Thailand By Dr. Witaya CHADBUNCHACHAI Director, WHO Collaborating Center, Khon Kaen Hospital, Thailand
Thailand Road Safety Master Plan and Safe System Approach By Assoc.Prof.Dr. Pongrid KLUNGBOONKRONG Deputy Director of Sustainable Infrastructure Research and Development Center (SIRDC), Khon Kaen University, Thailand
Management of Road Safety on National Highways By Mr. Sujin MUNGNIMIT Director of Highways Safety Bureau, Department of Highways, Ministry of Transport, Thailand

Moderator of <Session 2A>

Dr. Atsushi Fukuda
Professor of Department of Transportation Systems Engineering,
College of Science and Technology, Nihon University
E-mail: fukuda.atsushi@nihon-u.ac.jp

Brief Biography:

Professor Atsushi FUKUDA has served in the academic field for 26 years teaching and doing research in the field of transportation systems analysis and transportation planning. He was seconded by the Japan International Cooperation Agency (JICA) as Assistant Professor to the Asian Institute of Technology for two years. He has also fulfilled his responsibility as Chairperson of the Advisory Committee for many ODA projects such as the study on improvement of road traffic environment in Chiang Mai City, Thailand.

Prof. Fukuda has led various feasibility studies on the Clean Development Mechanism, Nationally Appropriate Mitigation Actions (NAMAs) and Joint Crediting Mechanism (JCM) studies in the transport sector in the ASEAN region.

Education:

1978-1982:	*B.Eng. (Transportation Engineering) Nihon University*
1982-1984:	*M.Eng. (Transportation Engineering) Nihon University*
1984-1988:	*Dr.Eng, (Transportation Engineering) Nihon University*

Honors and Awards:

1988	*IATSS Dissertation Award, IATSS*
1997	*Best Presenter Award, 52th Annual Meeting of JSCE*
2003	*Best Paper in the Decision Technologies Track Award, 36th Annual Hawaii International Conference in System Sciences*
2006	*Excellent Practice Paper Award, the 3rd National Transport Conference, Ministry of Transport, Engineering Institute of Thailand, Khonkean University*
2009	*International Activity Incentive Award, Japan Society of Civil Engineers (JSCE)*

First Speaker of <Session 2A>

Dr.Yoshiharu DOI and Dr. Chang-Yi LUO
Toyota InfoTechnology Center Co., Ltd., Japan
E-mail:yo-doi@jp.toyota-itc.com

Brief Biography:

Dr. Chang-Yi Luo is Researcher at Toyota InfoTechnology Center, research institute of Toyota Group to realize the future of "Mobility Society with the Connected Car". He has worked for think tank, public, and private sectors, and is experienced in international technical and industrial collaboration. His current research focus is on Intelligent Transportation System (ITS) with Vehicles to Everything (V2X) technology. ITS V2X is one of the future key technology to improve traffic efficiency and road safety. In order to improve the road safety in Asia, he is conducting traffic accident analysis with local partners to realize desirable ITS V2X system design such as Vehicle to Motorcycle cases.

V2X Development for Road Safety in Japan and Its Trial for V2M in Taiwan

By Dr.Yoshiharu DOI and Dr. Chang-Yi LUO

Summary:

Road safety is always a key concern for automaker, and Toyota Motors has its ultimate goal for road safety to achieve zero casualties from traffic accident. The future "Connected Car" is going to be smarter, safer, and more convenient through new technology such as ITS V2X (Vehicle to Everything). When vehicle is able to communicate with other vehicles, infrastructure, motorcycle, bicycle, pedestrian and so on in the future, a new mobility society will be realize to not only improve mobility efficiency, but in other aspects such as safety as well.

Japan is the first country in the world to provide ITS V2X service, which is called ITS Connect [1]. ITS Connect provides a number of ITS applications such as safety, emergency vehicle priority passing, information support of traffic light, and so on through V2I (Vehicle to Infrastructure) or V2V (Vehicle to Vehicle) communication. In Japan, accidents happened near intersection account for about 40% of total accidents and by implementing the service, the number of accidents in intersection are expected to be reduced [2].

Except for the current ITS V2X (V2I and V2V) service provided in Japan, vehicle communications to other objects such as motorcycle, bicycle and pedestrian are evaluated through a number of field of test in Japan and other countries.

According to the WHO's Global status report on road safety 2015, the total road traffic death is 1.25 million per year. Moreover, in Asia, the road traffic death of motorcyclist account for 43% of the total road traffic death, and is 11% higher than the world average [3]. To reduce motorcycle accidents through V2M (Vehicle to Motorcycle) will be a common interest for Asian countries.

Taiwan has the highest motorcycle ownership in the world which is about 657 out of 1000 people [4], and motorcycle fatality is about 41% of total road fatality [5]. In Taiwan, we has worked with local partners to conduct traffic accident analysis to find out the collision types among different types of vehicle. Basic field of trial is also carried in Taiwan to evaluate the effectiveness of V2M safety application.

Toyota ITC is working continuously on road safety in Asia and currently in 2017 starting to conduct traffic accident analysis in the Philippines (Metro Manila) and Vietnam (Ho Chi Minh City) to find out desirable system design for V2M application.

Finally, by expanding the collaboration with other Asian countries in the future, we would like to explore the possible to realize new ITS service with Asian partners.

[1] "ITS Connect Promotion Consortium Website", [online] https://www.itsconnect-pc.org/en/
[2] "Traffic accidents situation", Japan's National Police Agency, [online] http://www.npa.go.jp/english/

[3] "Global status report on road safety 2015", WHO, [online] http://apps.who.int/iris/bitstream/10665/189242/1/9789241565066_eng.pdf?ua=1, 2017
[4] "World Motor Vehicle Statistics", JAMA, 2014
[5] "Road Traffic Accident - by Vehicles", Taiwan's National Policy Agent, [online] https://www.npa.gov.tw/NPAGip/wSite/lp?ctNode=11500&xq_xCat=10&mp=

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10th ATRANS Annual conference on "Transportation for a Better Life: Mobility and Road Safety Managements"
18 August 2017, Radisson Blu Plaza Hotel, Sukhumvit Road, Bangkok, Thailand

V2X Development for Road Safety in Japan and Its Trial for V2M in Taiwan

Chang-Yi Luo, PhD.
Toyota InfoTechnology Center

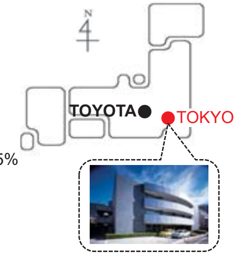
18 August 2017

Who we are

Driven by new challenges in the development of advanced IT,
Toyota InfoTechnology Center continues to bring superior innovation and increased value
to the automotive industry and the mobility society as a whole.

TOYOTA InfoTechnology Center Co., Ltd.

Established: Jan 12, 2001
Investors:
- TOYOTA MOTOR CORP 65%
- DENSO 10%
- KDDI 10%
- TOYOTA TSUSHO 5%
- AISIN SEIKI 5%
- Kyocera 3%
- TOYOTA INDUSTRIES 1%
- TOYODA GOSEI 1%



R&D activities

Vehicle Communications	Networks
Next-Generation Smart Center	Cybersecurity
Data Engineering and Analytics	Mobility Services Platform

TOYOTA InfoTechnology Center, U.S.A., Inc.

New York Office
Location : New York
Function : Business Research

HQ
Location : Mountain View, CA (Silicon Valley; close to Google)
Function : Research and Development with Academia and Business Venture

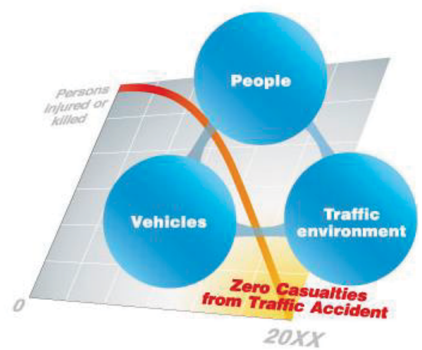
Future "Connected Car"

Future "Connected Car" communicates to Everything (Vehicle to Everything, V2X),
and is going to be smarter, safer, and more convenient

Our Ultimate Goal: Zero Casualties from Traffic Accident

Our approach is to promote a three-part initiative consisting of **people, vehicles and traffic environments**, as well as continuing our pursuit of "Real-world Safety."
Real-world Safety is based on **our continuous efforts to learn from real collisions**.

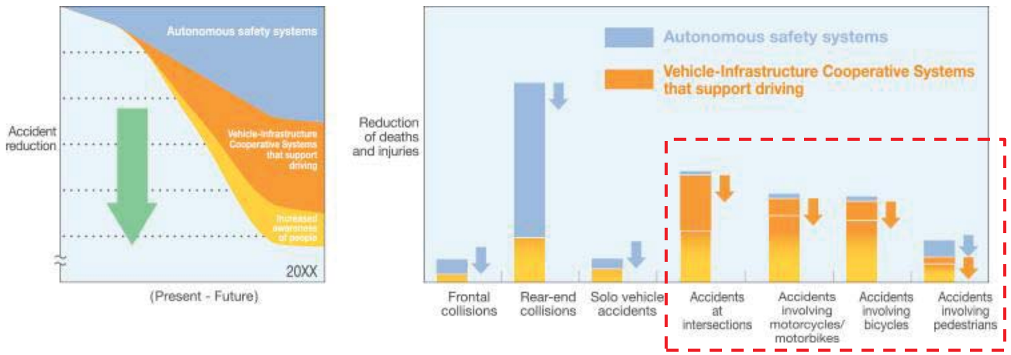
Integrated Three Part Initiative



Pursuit of Real-world Safety

Toward Zero Casualties

V2I Communication can further reduce the "Non-Line of sight accidents" which cannot be detected by a vehicle's own sensors.

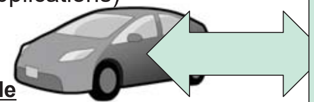


Source: "Toyota Cooperative ITS", http://www.toyota-global.com/innovation/intelligent_transport_systems/infrastructure/

ITS Service in Japan

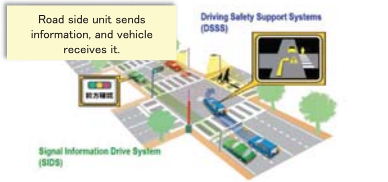
ITS Connect (V2X system in Japan)

- ITS Connect is a communication system between Vehicle to X(something)
  - **V2I Vehicle to Infrastructure**
  - **V2V Vehicle to Vehicle**
  - V2P Vehicle to Pedestrian
- What is application? (including potential applications)
  - **Safety**
  - **Environment**
  - **Smooth cruising for VIP/Emergency vehicle**
  - Rescue support at big disaster
  - Please see : http://newsroom.toyota.co.jp/en/detail/9676551/



- **Rode side unit**
- **Other vehicle**
- Motorcycle
- Bicycle
- Pedestrian
- And so on

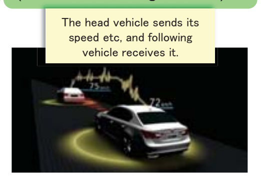
V2I system
Safety at junction & Environment



V2V system

Safety / Smooth cruising for Emergency vehicle

Controlling vehicle distance (Automated Driving function)



Japan V2X situation (already in Market)

- Vehicle Side
  - Toyota had shipped car supporting V2X technology from 2015.
  - http://newsroom.toyota.co.jp/en/detail/9676551/ (English)
  - http://toyota.jp/technology/safety/itsconnect/ (Japanese)
- Road Side Unit
  - National Police Agency decided to install 760MHz ITS for V2I
  - 23 junctions @ 2015/October
  - 52 junctions @ 2016/April
  - 70 junctions @ 2017/March

Prius PHV Prius
Leading car of Environment brand

Crown Athlete Majesta Royal
Flag ship of Toyota brand

Lexus RX
Lexus brand of Toyota

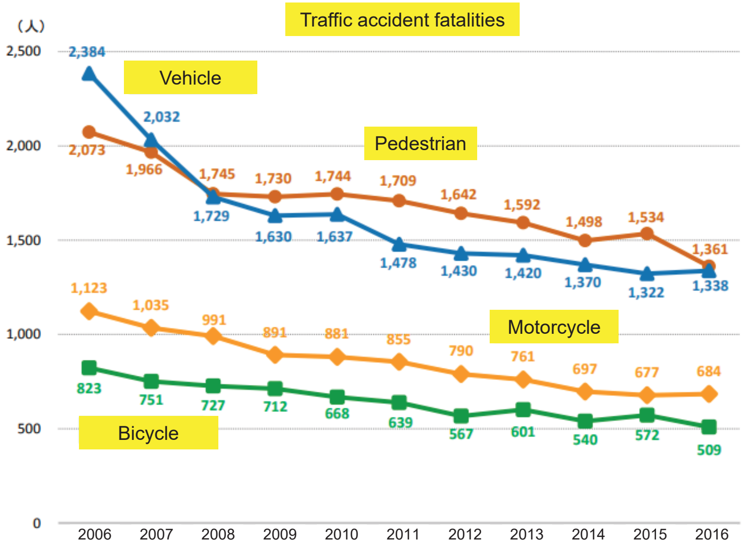
Source : http://toyota.jp/technology/safety/itsconnect/

ITS Connect video

ITS V2X Development in Japan

Traffic accident in Japan

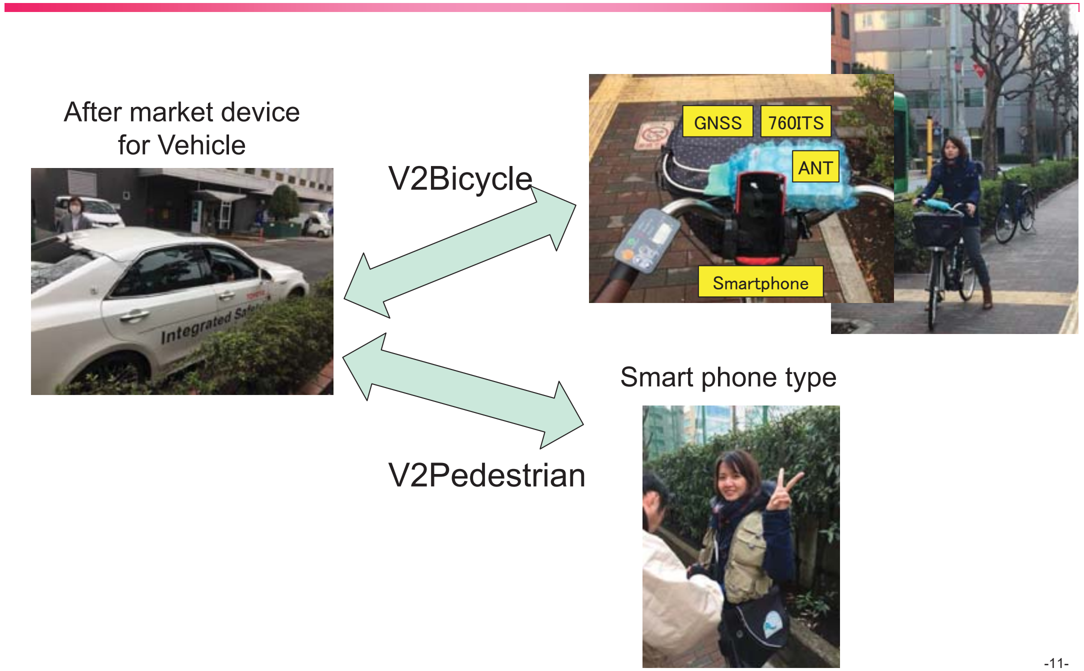
Pedestrian is the biggest number in fatalities lately in Japan



Total:
6,403 in 2006
3,904 in 2016

Source : 2018 Fatality Report, Japan National Police Agency, https://www.npa.go.jp/toukei/koutuu48/H28_setsumeishiryo.pdf, 2017

V2P/V2B Development



V2Pedestrian (normal people)

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Key technology for release is to detect pedestrian behavior

Pedestrian side | Vehicle side

V2Bicycle

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Good results
Good positioning accuracy

Bicycle side | Vehicle side

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Trial for V2M in Taiwan

Traffic accident in Taiwan

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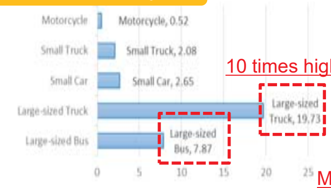
- In 2015, there are 1,696 fatal accident in Taiwan.
- There are totally 2.1 million registered vehicle in Taiwan, and 64% is composed by motorcycle. (Ownership is 657 out of 1000)

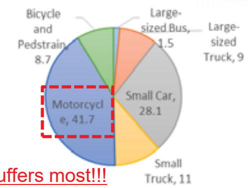
The ratio of registered vehicle in Taiwan

Cause of Fatality



10 times higher!!!

The ratio of fatality caused

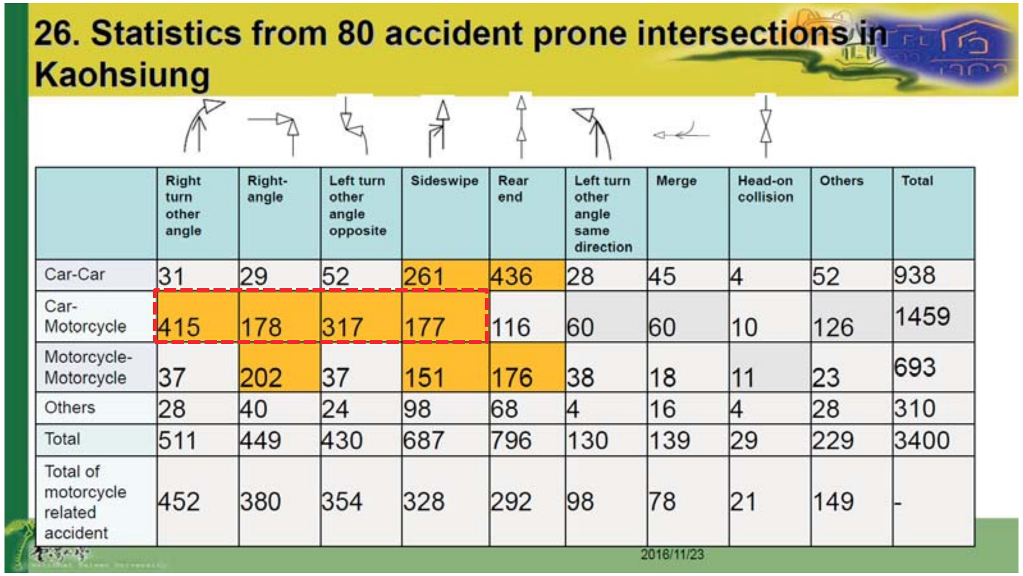


Motorcycle suffers most!!!

The ratio of fatality

Motorcyclist Fatality is about 40% of total fatality in Taiwan

Traffic Analysis in Kaohsiung


26. Statistics from 80 accident prone intersections in Kaohsiung

	Right turn other angle	Right-angle	Left turn other angle opposite	Sideswipe	Rear end	Left turn other angle same direction	Merge	Head-on collision	Others	Total
Car-Car	31	29	52	261	436	28	45	4	52	938
Car-Motorcycle	415	178	317	177	116	60	60	10	126	1459
Motorcycle-Motorcycle	37	202	37	151	176	38	18	11	23	693
Others	28	40	24	98	68	4	16	4	28	310
Total	511	449	430	687	796	130	139	29	229	3400
Total of motorcycle related accident	452	380	354	328	292	98	78	21	149	-

2016/11/23

Source: "Traffic accident analysis result in Taiwan", Tien-Pen Hsu (Taiwan University), 2016

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V2M Safety Application (FoT in Taiwan 2016 1/2)

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V2M Safety Application (FoT in Taiwan 2016 2/2)

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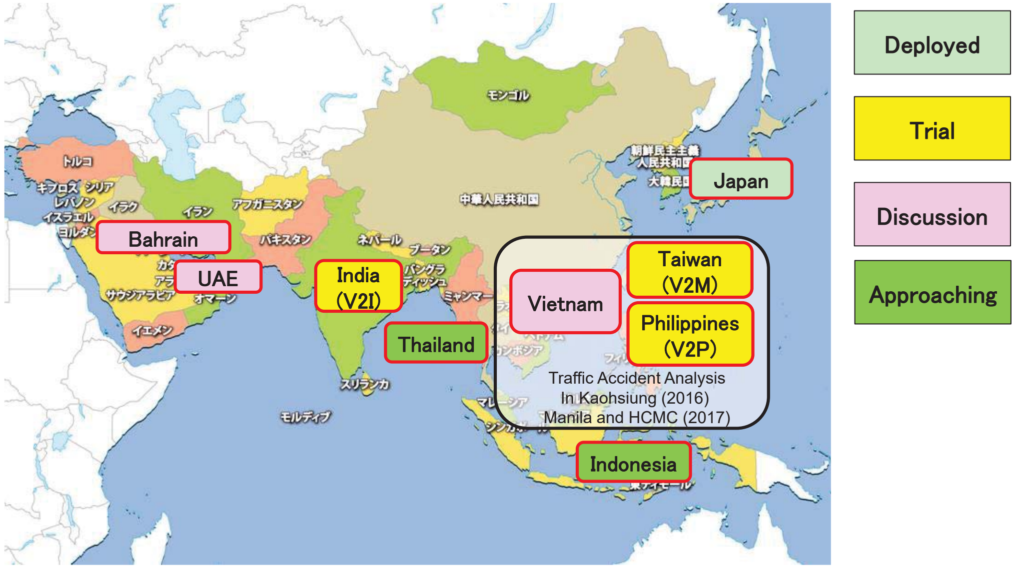
Asian V2X Activity

V2X Activities in 2017



Conclusion

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- The characteristics of Asian road traffic is distinguished from the US, EU, and JP.
- The future Connected Car world must adapt local road traffic (precise map info., accident pattern, and etc.) to provide new service such as mobility efficiency and safety.
- We, Toyota ITC would like explore the possibility together on new V2X services such as V2M safety (Message Set and Standardization) with Thailand and Asian partners.

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End of file

Second Speaker of <Session 2A>

Prof.Dr.Satoru KOBAYAKAWA
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E-mail: kobayakawa.satoru@nihon-u.ac.jp

Brief Biography:

EDUCATION

Dr. of Eng.	*Nihon University, Transportation Engineering, 2004*
Master of Eng. Mgt.	*The George Washington University, Transportation Management (USA), 1994*
Bachelor of Eng.	*Nihon University, Transportation Engineering, 1991*

EMPLOYMENT

-Professor (2012-Present)	*Department of Transportation Systems Engineering, College of Science & Technology, Nihon University*
-Associate Professor (2009-2012)	*Department of Transportation Engineering & Socio-Technology, College of Science & Technology, Nihon University*
-Visiting Researcher (2005-2006)	*Institute of Transport Study, Leeds University (UK)*
-Senior Lecturer (2005-2009)	*Department of Transportation Engineering & Socio-Technology, College of Science & Technology, Nihon University*
-Research Associate (1995-2005)	*Department of Transportation Engineering & Socio-Technology, College of Science & Technology, Nihon University*

RESEARCH FIELD

1) Logistics system in urban area
2) Parking management (including parking control, parking planning, parking enforcement and eal)
3) Bike path planning
4) Road traffic safety approach at the local government
5) Urban transportation management for transportation demand management (TDM)

Road Accidents and Awareness raising through Public Participatory Approach in Japan

By Prof. Dr. Satoru KOBAYAKAWA

Summary:

The number of traffic accidents and fatalities are decreasing recent years in Japan. Both the number of traffic accidents and the number of injuries in traffic accidents have decreased for 11 years and the number of fatalities has decreased to less than one fourth of the peak time which was 16,765 in 1970. However, on the other hand, it is reported that traffic accidents at minor road and community road are not decreased because it is difficult to identify the location and acceptable countermeasures for local citizens. Therefore, Japanese government concerned the promotion of community participation and cooperation to develop the countermeasure for traffic safety at residential district.

The study of Traffic Safety Measure Support System (TSMSS) has begun in 1997 through the operation and support of the foundation act of the International Association of Traffic and Safety Sciences (ITASS). The research continued until 2000, when the basic concepts and details of the system where confirmed. Between 2001 and 2004, social experiments were conducted in Chiba Prefecture Kamagaya city, Japan. Through this, the system became promising as a traffic accident safety measure system. From 2005 till 2006, the system, with the financial aid of Land Policy Research Committee, applied the system to two cities in Chiba Prefecture. From 2008 till 2009, TSMSS has applied to Penang city in Malaysia. The system was translated to English and Malay in order to gather the data from local people. Currently, from 2016 until 2018, this challenge is in the second stage to reduce the traffic accidents in two cities (Penang and Seberang Perai) in Malaysia.

This system integrates management the traffic accident data and the Hiyari experience data to collect from the citizen using the Web GIS technology. Then, it makes a base to rationalize and streamline the planning and the drafting of the safety measure. As shown in Figure 1 this system has two sub systems which are Hiyari Experience Input Sub System (HEISS) and Traffic Accident Analysis Sub System (TAASS). Hiyari Experience Input Sub System (HEISS) has a function to report the Hiyari experience which the road user experienced actual condition and to create Hiyari map. Traffic Accident Analysis Sub System (TAASS) has a function to exchange the information the area residents, the road traffic administration and the expert to plan the traffic safety countermeasure. They can easily understand and improve the traffic safety plan.

The principals for this concept is the relationship between traffic experts and citizen participants. At Chiba prefecture in Japan, the Japanese style "Road Safety Audit" has been examined from 2013 supported by MLIT of Chiba National Road Office. This trial is based on the subject of picking up the traffic hazardous location and developing the proposal of countermeasure for traffic accidents on both main roads and minor road. After the local government received the proposals, they tried to carry out the improvements

10th ATRANS ANNUAL CONFERENCE
(2017.8.17)

Road Accidents and Awareness raising through Public Participatory Approach in Japan

Satoru KOBAYAKAWA, Dr.
Professor
NIHON UNIVERSITY

Traffic Accidents in Japan

Overall Condition

- Number of accidents: 536,899
- Number of casualties: 670,140
- Number of injuries: 666,023
- Number of fatalities : 4,117 (within 24 hours)
  : 4,859 (within 30 days)

Reference: WHITE PAPER ON TRAFFIC SAFETY IN JAPAN 2016

10th Traffic Safety Basic Plan (Road Transport)

- "Traffic Safety Basic Plan" was prepared every 5 years in order to implement traffic safety measures in our country
- Goals in the Traffic Safety Basic Plan
  - Decreasing the number of fatalities within 24 hours to less than 2,500 by 2020 (3,000 fatalities within 30 days)
  - Decreasing the number of casualties to less than 500,000 by 2020

Reference: WHITE PAPER ON TRAFFIC SAFETY IN JAPAN 2016

10th Traffic Safety Basic Plan (Road Transport)

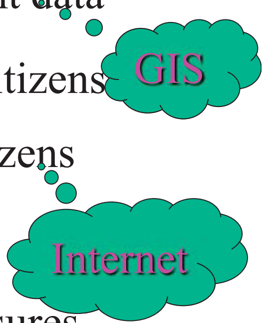
Subjects to be Dealt with in a Focused Manner in order to Reduce Damage Caused by Traffic Accidents

- Ensuring Safety of Elderly People and Children
- Ensuring Safety of Pedestrians and Bicycles
- Ensuring Safety in Community Roads

Promotion of Community-based Traffic Safety Measures

Key Points of Traffic Safety Measures

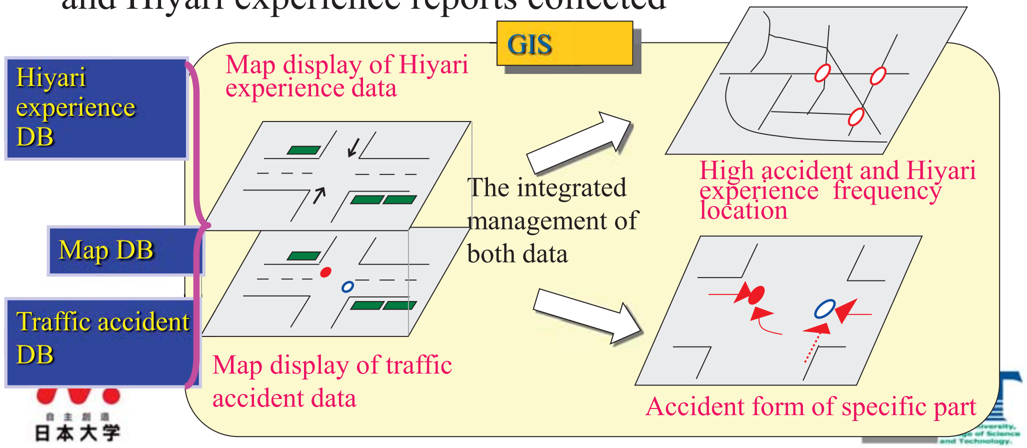
1. To scientifically analyze traffic accident data
2. To promote communication between citizens and local governments, and among citizens
3. To train experts and to utilize them
4. To quantitatively evaluate countermeasures



Overview of the scheme

The scheme uses an ICT system with Web GIS and the Internet that integrately manage

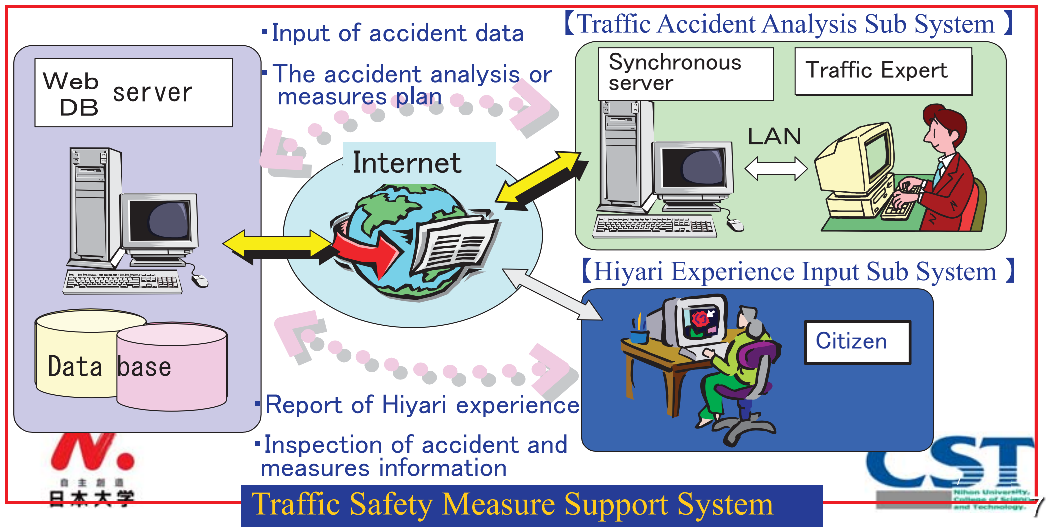
- traffic accident data
- and Hiyari experience reports collected



Overview of the scheme

The scheme assists

- to promote consciousness of citizens about traffic safety
- and to reach consensuses on implementing traffic safety measures.



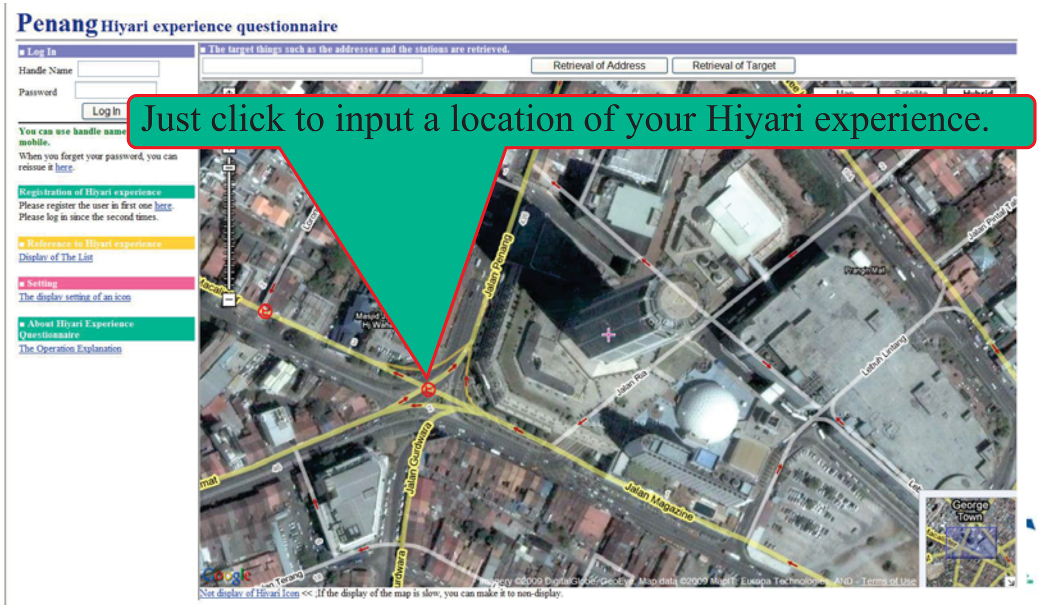
What are Hiyari experience reports?

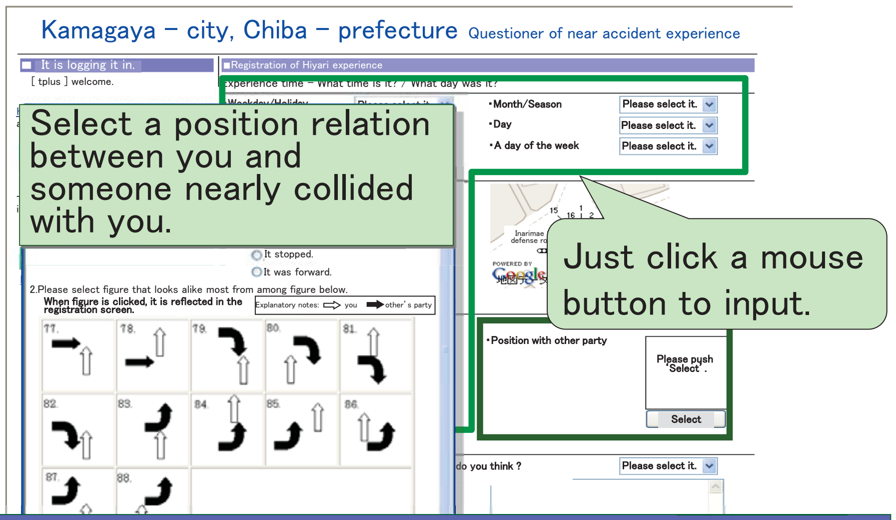
- Given by drivers, riders, and pedestrians.
- Subjective reports of their experiences where
  - A car nearly hit another car.
  - A pedestrian was nearly hit by a car.
  - A bicycle rider is sometimes scared by heavy trucks.
  - A pedestrian is sometimes chased by bicycles.
  - Etc.

Implementation of TSMSS

- The study of Traffic Safety Measure Support System (TSMSS) has begun in 1997 supported by ITASS
- Between 2001 and 2004, social experiments were conducted in Chiba Prefecture Kamagaya city, Japan
- From 2005 till 2006, the system, with the financial aid of Land Policy Research Committee, applied the system to two cities (Shiroi and Ichikawa) in Chiba Prefecture.
- From 2008 till 2009, TSMSS has applied to Penang city in Malaysia
- Currently, this challenge is in the second stage to reduce the traffic accidents in two cities (Penang and Seberang Perai) in Malaysia

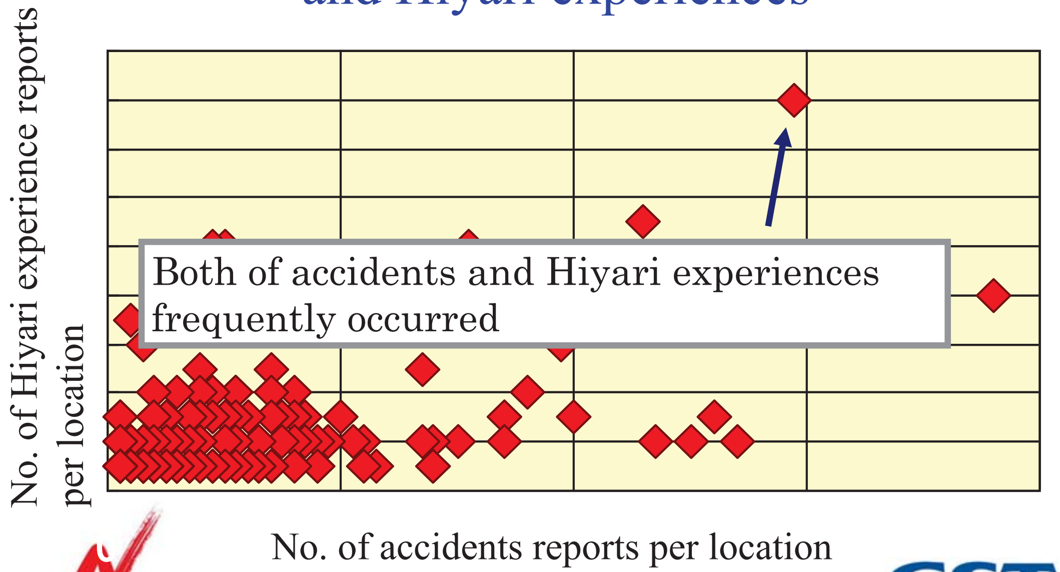
Input locations of your Hiyari experiences via the Internet



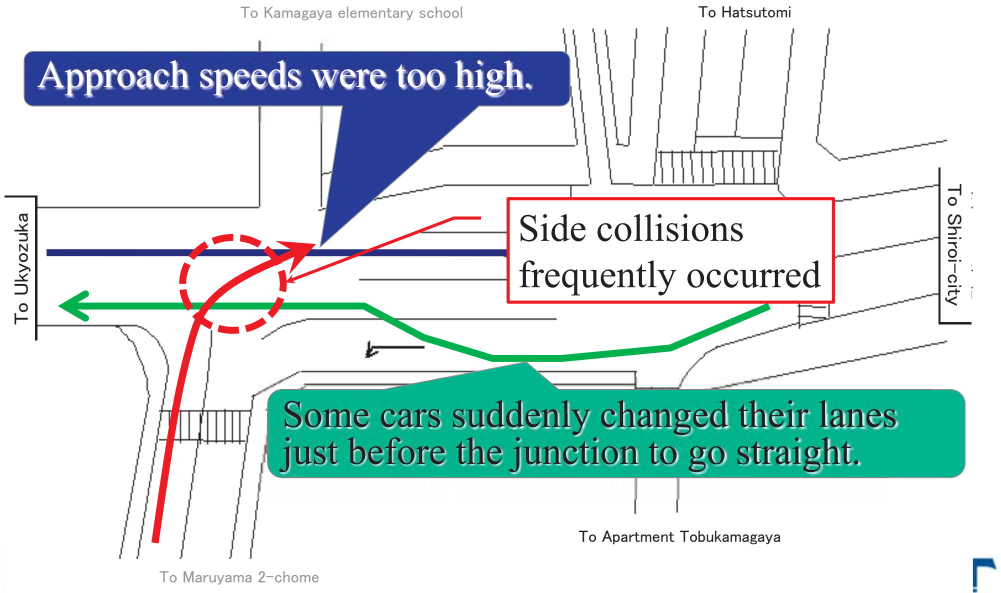


These detailed information of attributes of Hiyari experiences is essential to match them with accident records.

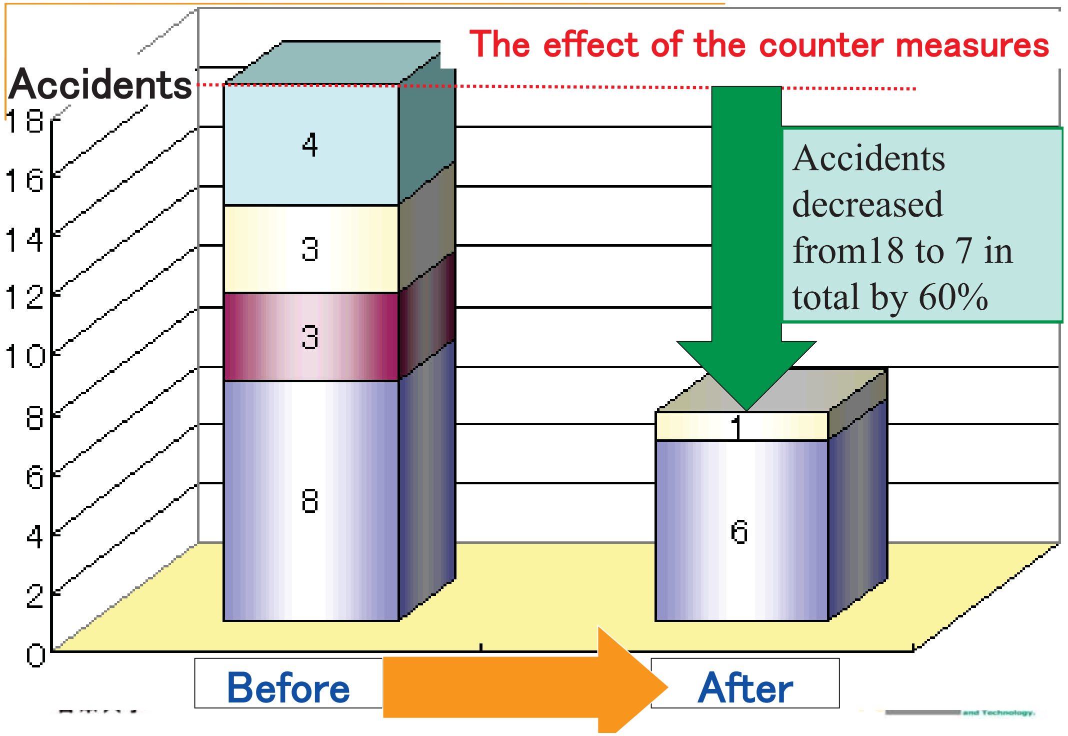
An integrated analysis of accidents and Hiyari experiences



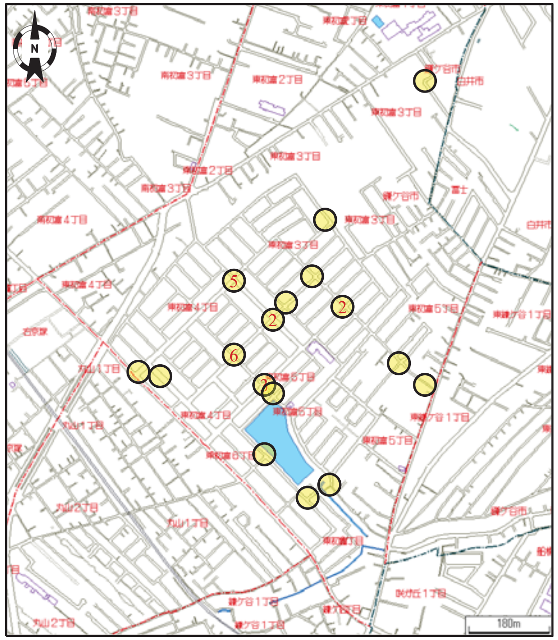
Estimated causes of accidents at the junction



Countermeasures installed at the junction



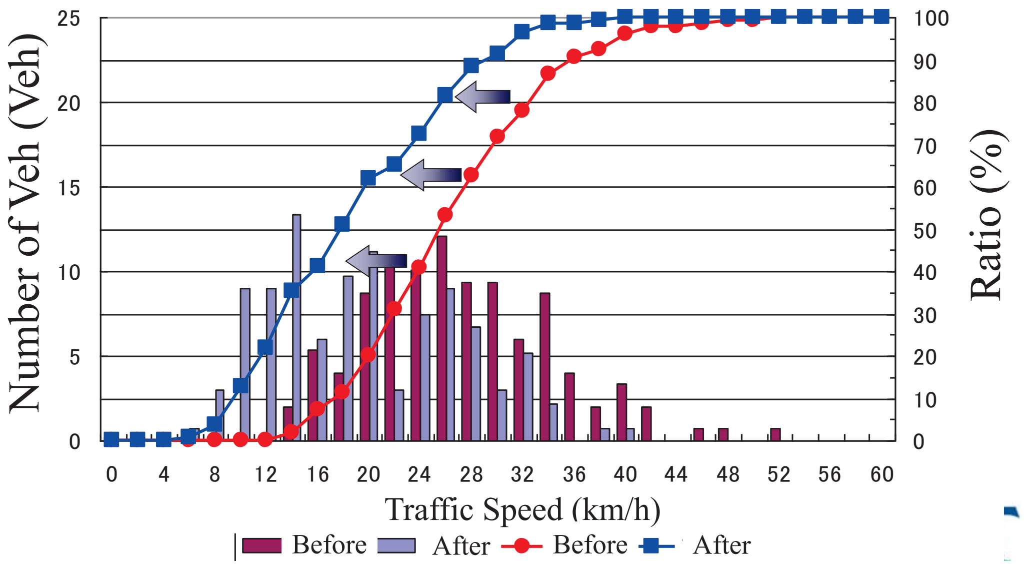
Traffic Accidents in Residential Area



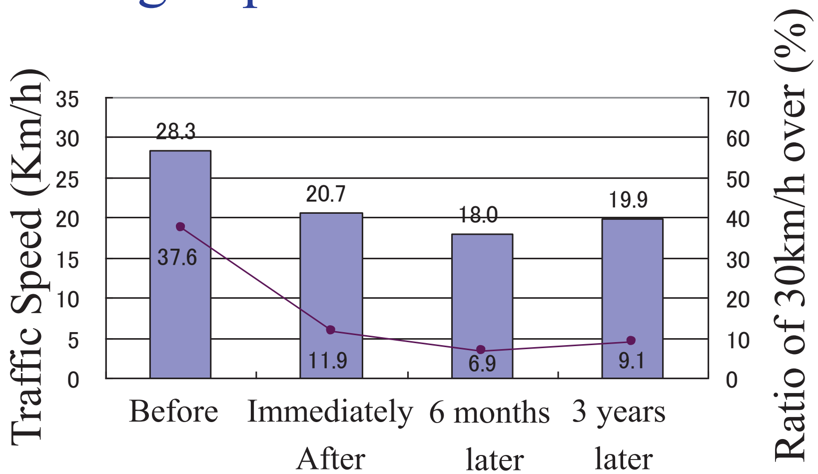
Workshop in Residential Area

Countermeasure in the Residential Area

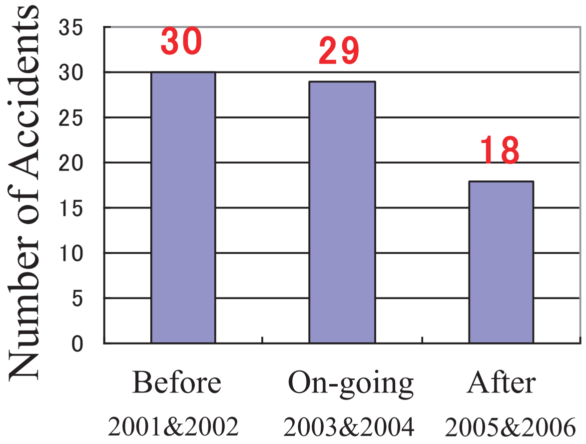
Traffic Speed in Residential Area



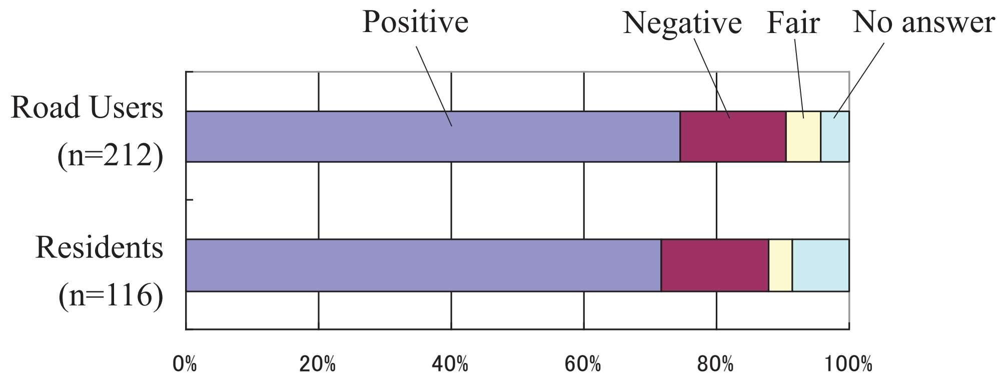
Average Speed in Residential Area



Traffic Accidents in Residential Area

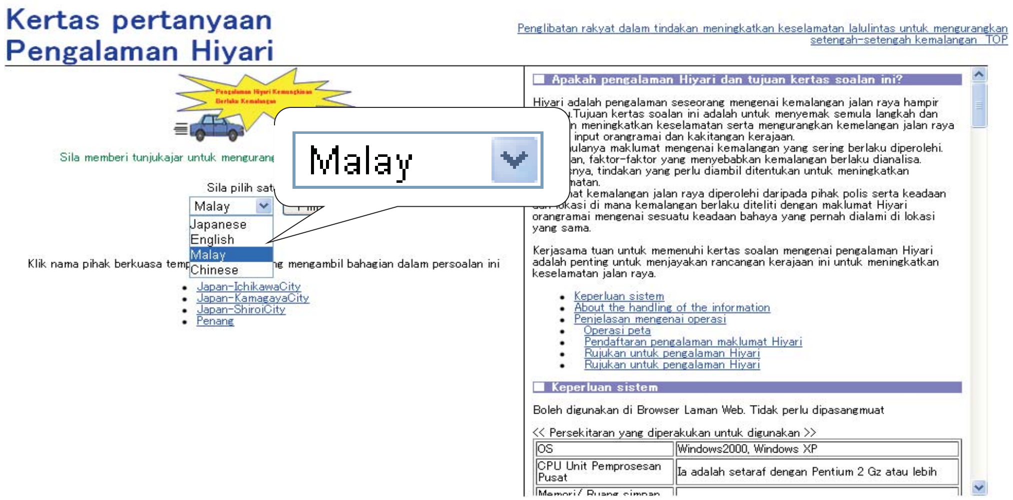


The Result of Questionnaires



70% of respondents answered positive about countermeasures in the residential area.

Malay, Mandarin and English are available for reporting Hiyari experiences



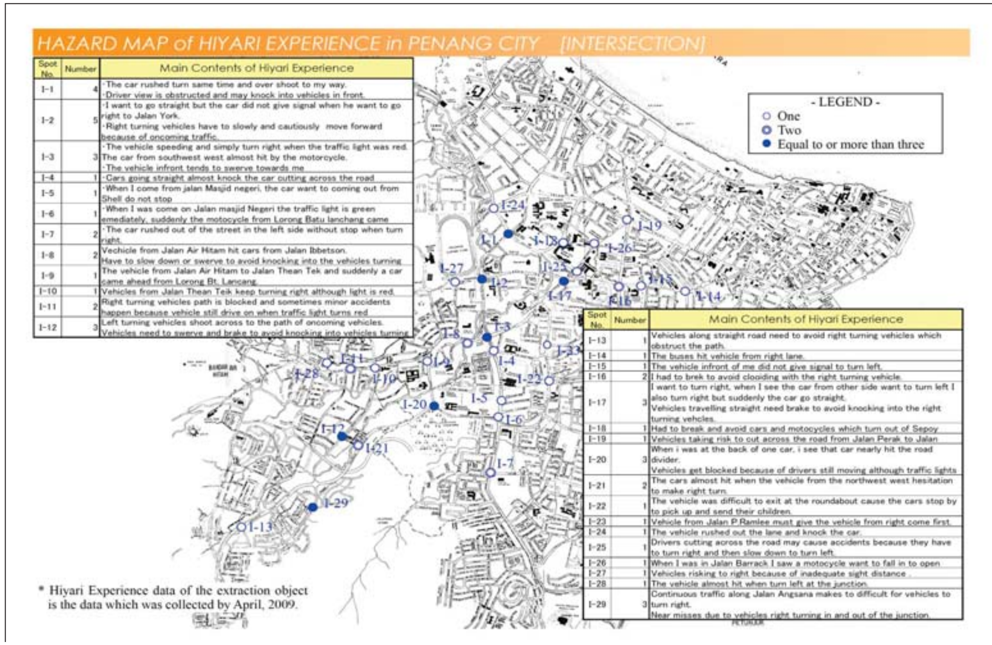
Hiyari experiences were reported by professional drivers and local government officer

Workshop at the "Rapid Penang"

222 reports were collected and input finally by Sept., 2011

日本大学

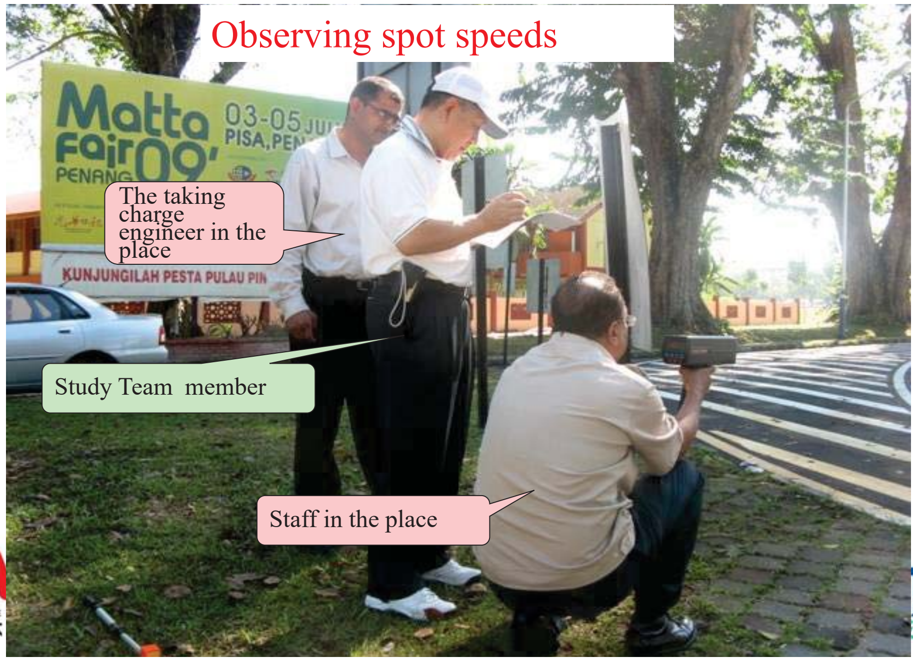
Hazard map based on Hiyari experience data reported to the city office and of the traffic police



Spot No.	Number	Main Contents of Hiyari Experience
I-1	4	·The car rushed turn same time and over shoot to my way. ·Driver view is obstructed and may knock into vehicles in front.
I-2	5	·I want to go straight but the car did not give signal when he want to go right to Jalan York. ·Right turning vehicles have to slowly and cautiously move forward because of oncoming traffic.
I-3	3	·The vehicle speeding and simply turn right when the traffic light was red. The car from southwest west almost hit by the motorcycle. ·The vehicle infront tends to swerve towards me
I-4	1	·Cars going straight almost knock the car cutting across the road
I-5	1	·When I come from jalan Masjid negeri, the car want to coming out from Shell do not stop
I-6	1	·When I was come on Jalan masjid Negeri the traffic light is green emediately, suddenly the motocycle from Lorong Batu lanchang came
I-7	2	·The car rushed out of the street in the left side without stop when turn right.
I-8	2	Vechicle from Jalan Air Hitam hit cars from Jalan Ibbetson. Have to slow down or swerve to avoid knocking into the vehicles turning
I-9	1	The vehicle from Jalan Air Hitam to Jalan Thean Tek and suddenly a car came ahead from Lorong Bt. Lancang.
I-10	1	Vehicles from Jalan Thean Teik keep turning right although light is red.
I-11	2	Right turning vehicles path is blocked and sometimes minor accidents happen because vehicle still drive on when traffic light turns red
I-12	3	Left turning vehicles shoot across to the path of oncoming vehicles. Vehicles need to swerve and brake to avoid knocking into vehicles turning

Spot No.	Number	Main Contents of Hiyari Experience
I-13	1	Vehicles along straight road need to avoid right turning vehicles which obstruct the path.
I-14	1	The buses hit vehicle from right lane.
I-15	1	The vehicle infront of me did not give signal to turn left.
I-16	2	I had to brek to avoid clooiding with the right turning vehicle.
I-17	3	I want to turn right, when I see the car from other side want to turn left I also turn right but suddenly the car go straight. Vehicles travelling straight need brake to avoid knocking into the right turning vehcles.
I-18	1	Had to break and avoid cars and motocycles which turn out of Sepoy
I-19	1	Vehicles taking risk to cut across the road from Jalan Perak to Jalan
I-20	3	When i was at the back of one car, i see that car nearly hit the road divider. Vehicles get blocked because of drivers still moving although traffic lights
I-21	2	The cars almost hit when the vehicle from the northwest west hesitation to make right turn.
I-22	1	The vehicle was difficult to exit at the roundabout cause the cars stop by to pick up and send their children.
I-23	1	Vehicle from Jalan P.Ramlee must give the vehicle from right come first.
I-24	1	The vehicle rushed out the lane and knock the car.
I-25	1	Drivers cutting across the road may cause accidents because they have to turn right and then slow down to turn left.
I-26	1	When I was in Jalan Barrack I saw a motocycle want to fall in to open
I-27	1	Vehicles risking to right because of inadequate sight distance .
I-28	1	The vehicle almost hit when turn left at the junction.
I-29	3	Continuous traffic along Jalan Angsana makes to difficult for vehicles to turn right. Near misses due to vehicles right turning in and out of the junction.

Observation of road and traffic conditions on the site



日本

Reviewing of the traffic safety measure

It reviews a traffic safety measure at the measure object part with the member of the engineering department and the traffic police.

日本大学

CST

The Scheme of Road Traffic Safety Based on Sharing Information

does not decide anything, but assists a local government and citizens

– to appropriately give priority to countermeasures against traffic accidents
– and to precisely evaluate effects of them
– by effectively collecting , analyzing, showing and sharing traffic accident data and Hiyari experience (near miss) reports.

Third Speaker of <Session 2A>

Dr. Witaya Chadbanchachai
ATRANS Board Committee and
Director of Trauma & Critical Care Center,
WHO Expert Advisory Panel for Injury Prevention & Control.
E-mail:buncha96@yahoo.com, dr.bunchachai@gmail.com

Brief Biography:

Education:
1983: Fellow of Royal College, Surgery, Faculty of Medicine, Khon Kaen
1977: MD, Medicine, Mahidol University, Thailand

Position:
-Director of WHO Collaborating Center on Injury Prevention and Safety Promotion
-Member in WHO Trauma and Emergency Care Services Advisory Group
-Consultant in the Board of National Institute for Emergency Medical Service
-Consultant of MOPH trauma service plan committee
-Chairman of Provincial Technical Support for Traffic Injury Prevention Project, Thai Health Promotion Foundation
-Expert Advisory Panel on Injury and Violence Prevention and Control, WHO-Geneva
-SEARO road traffic advisory panel committee
-Member in the Board of Asian Transport Research Society

Experience:
1993 Traumatology, Alfred Hospital, Monash University,Australia
1995 Emergency Medicine Service, JICA, Japan

Honour, award received:
1992 Topnotch Physician Award, International College of Surgeon of Thailand
1994 Topnotch Physician Award, Medical and Disaster Institute, Medical Department
1995 Bronze prize in Paper Presentation Annual Academic Conference, Ministry of Public Health
1995 Golden prize in Paper Presentation Annual Academic Conference, Ministry of Public Health
1997 Mahidol – B Braun Award
2003 Personal excellent award in Traffic Injury Prevention, National Safety Council
2008 Gold Medal in UC Partnership Award , National Health Security Office
2010 Personal excellent award ,Royal college of surgeon of Thailand
2012 Physician excellent award, Medical Council of Thailand
2015 Robert Danis Prize, International Society of Surgery
2017 Personal excellent award, National Institute of Emergency Medicine

Policy implication and practical approach of Road Safety in Thailand
By Dr. Witaya Chadbanchachai

Summary:

For Thailand, more than 20,000 people died from RTI each year, which mean that every 24 minute will has 1 people died from RTI, and around 1 million people getting injured. Even the problem was recognized by the present government and raised higher in priority but still many road traffic injury prevention, and countermeasures are still need to be seriously planned and implemented. Many new regulations, legislations are required according to global standard such as the graduated licensing system, the E license, the linked data system for traffic injury information , the compulsory blood alcohol measure for the injured and the counterpart, the UN vehicle standard for new vehicles , the UN standard for new road construction, the focal body for road traffic safety administration, the adequate budget for national road safety programs.

The procedure to achieve these countermeasure need systematic and effective advocacy process which included;-
Identify likely sources of opposition
Anticipate their likely framing
Identify barriers (other than direct opponents)
Identify (and engage) likely supporting partners
Identify (and engage) likely political/opinion leader “champions”
Develop an advocacy strategy
Through these advocacy processes, we had several success stories such as;
@ Seatbelt Policy Year 1996 Law enforcement
@ Helmet Policy Year 1993 Law enforcement
@ Law enforcement on Drunken don’t drive year 2000
@ No alcohol in Bhuddist-Lent period (July-September) campaign year 2002
@ No Mobile phone holding when driving Year 2008 Law enforcement
@EMS act 2008
Anyway having new regulation or legislation do not guarantee that the road toll and injured will be reduced, we have to have stronger degree of enforcement which also need advocacy process to the related organization to enforce the new laws or regulations.

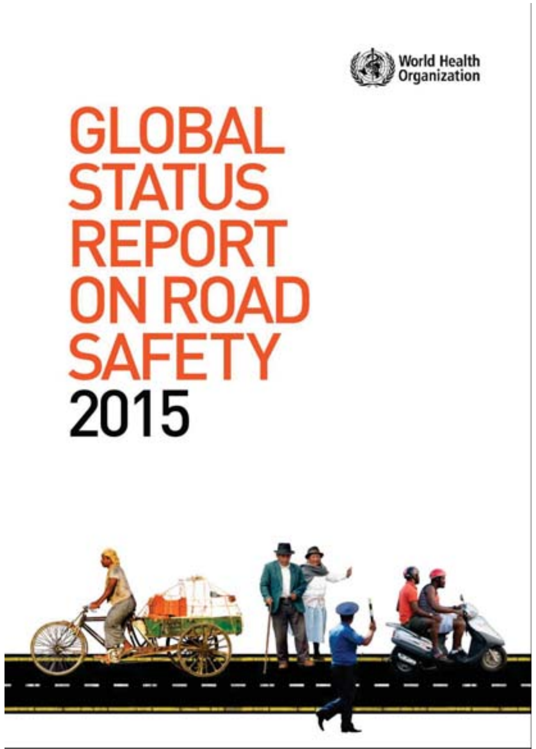


TABLE E4

Overview of methods used to obtain comparable country estimates

Estimation method	Country
GROUP 1 Countries/areas with good death registration data	Argentina, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belarus, Belgium, Belize, Brazil, Bulgaria, Canada, Chile, China *(14, 15)*, Colombia, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Fiji, Finland, France, Georgia, Germany, Greece, Guatemala, Guyana, Hungary, Iceland, Ireland, Israel, Italy, Jamaica, Japan, Kazakhstan, Kuwait, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Maldives, Malta, Mauritius, Mexico, Montenegro, Netherlands, New Zealand, Norway, Oman, Panama, Paraguay, Philippines, Poland, Portugal, Qatar, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Saint Lucia, Serbia, Singapore, Slovakia, Slovenia, South Africa, Spain, Suriname, Sweden, Switzerland, The former Yugoslav Republic of Macedonia, Trinidad and Tobago, Turkey, United Kingdom, United States of America, Uruguay, Uzbekistan, West Bank and Gaza Strip
GROUP 2 Countries with other sources of cause of death infromation	India *(16)*, Iran (Islamic Republic of), Thailand, Viet Nam
GROUP 3 Countries with populations less than 150 000	Andorra, Antigua and Barbuda, Cook Islands,Dominica, Kiribati, Marshall Islands, Micronesia (Federated States of), Monaco, Palau, Saint Vincent and the Grenadines, San Marino, Seychelles, Tonga
GROUP 4 Countries without eligible death registration data	Afghanistan, Albania, Algeria, Angola, Armenia, Bangladesh, Benin, Bhutan, Bolivia (Plurinational State of), Bosnia and Herzegovina, Botswana, Burkina Faso, Cabo Verde, Cambodia, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Honduras, Indonesia, Iraq, Jordan, Kenya, Lao People's Democratic Republic, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Peru, Rwanda, Samoa, Sao Tome and Principe, Saudi Arabia, Senegal, Sierra Leone, Solomon Islands, Somalia, Sri Lanka, Sudan, Swaziland, Tajikistan, Timor-Leste, Togo, Tunisia, Turkmenistan, Uganda, United Arab Emirates, United Republic of Tanzania, Vanuatu, Yemen, Zambia, Zimbabwe

Country/area	General Information			Road traffic deaths			
	Population numbers[a] for 2013	GNI per capita[b] for 2013 in US dollars	Income level[c]	Reported number of road traffic deaths[d]	Modelled number of road traffic deaths[e]: Point estimate	Modelled number of road traffic deaths[e]: 95% Confidence Interval	Estimated road traffic death rate per 100 000 population[e]
Sri Lanka	21 273 228	3 170	Middle	2 362	3 691	3 245 – 4 137	17.4
Sudan	37 964 306	1 550	Middle	2 281	9 221	7 746 – 10 697	24.3
Suriname	539 276	9 370	Middle	76	103	—	19.1
Swaziland	1 249 514	2 990	Middle	191	303	263 – 343	24.2
Sweden	9 571 105	61 760	High	260	272	—	2.8
Switzerland	8 077 833	90 760	High	269	269	—	3.3
Tajikistan	8 207 834	990	Low	508	1 543	1 387 – 1 699	18.8
Thailand	67 010 502	5 340	Middle	13 650[f]	24 237	—	36.2
The former Yugoslav Republic of Macedonia	2 107 158	4 870	Middle	198	[illegible]	—	9.4
Timor-Leste	1 132 879	3 940	[illegible]	96	[illegible]	158 – 219	16.6
Togo	6 816 982	530	[illegible]	1 044	[illegible]	1 719 – 2 526	31.1
Tonga	105 323	4 490	[illegible]	8	[illegible]	—	7.6
Trinidad and Tobago	1 341 151	[illegible]	[illegible]	147	[illegible]	—	14.1
Tunisia	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Turkey	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Turkmenistan	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Uganda	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
United Arab Emira[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
United Kingdom	[illegible]	[illegible]	[illegible]	1 770	1 827	—	2.9
United Republic of Tanzania	49 253 126	630	Low	3 885	16 211	13 116 – 19 307	32.9
United States of America	320 050 716	53 470	High	32 719	34 064	—	10.6
Uruguay	3 407 062	15 180	High	567	567	—	16.6
Uzbekistan	28 934 102	1 880	Middle	2 231	3 240	—	11.2
Vanuatu	252 763	3 130	Middle	12	42	37 – 47	16.6
Viet Nam	91 679 733	1 740	Middle	9 845	22 419	—	24.5
West Bank and Gaza Strip	4 326 295	3 070	Middle	133	241	—	5.6
Yemen	24 407 381	1 330	Middle	3 239	5 248	4 426 – 6 069	21.5
Zambia	14 538 640	1 810	Middle	1 797	3 586	2 914 – 4 257	24.7
Zimbabwe	14 149 648	860	Low	1 787	3 985	3 319 – 4 652	28.2

Thailand

Death registration data were available for the year 2002, with an estimated coverage of about 85%. However, the proportion of ill-defined conditions was nearly 50%, since many deaths in Thailand occur at home, and the cause of death is reported by lay people. In order to improve the usability of the

4. Countries without eligible death registration data

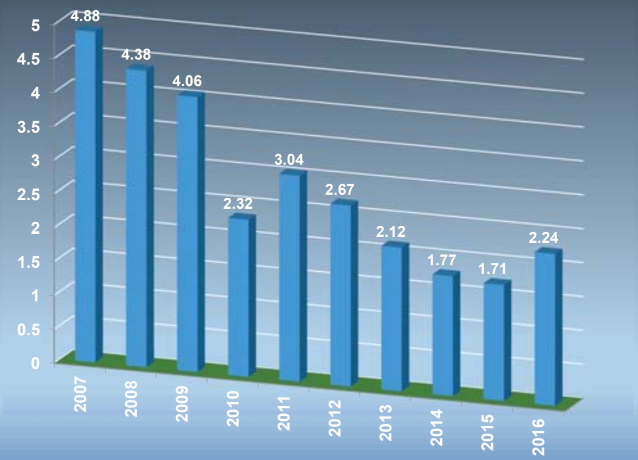
$$\ln N = C + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \ln Pop + \varepsilon \quad (1)$$

TABLE E3

Covariates used in the model

Independent variables	Description	Source of information	Included in models
ln(GDP)	WHO estimates of Gross Domestic Product (GDP) per capita (international dollars or purchasing power parity dollars, 2011 base)	WHO database	Models A, B, C
ln(vehicles per capita)	Total vehicles per 1000 persons	GSRRS surveys and WHO database	Models A, B, C
Road density	Total roads (km) per 1000 hectares	International Futures database *(11)*	Models A, B, C
National speed limits on rural roads	The maximum national speed limits on rural roads (km/h) from WHO questionnaire	GSRRS survey	Models A, B, C
National speed limits on urban roads	The maximum national speed limits on urban roads (km/h) from WHO questionnaire	GSRRS survey	Models A, B, C
Health system access	Health system access variable (principal component score based on a set of coverage indicators for each country)	Institute for Health Metrics and Evaluation dataset *(12)*	Models A, B, C
Alcohol apparent consumption	Liters of alcohol (recorded plus unrecorded) per adult aged 15+	WHO database	Models A, B, C
Population working	Proportion of population aged 15–64 years	World Population Prospects 2012 revision (UNDESA)	Models A, B, C
Percentage motorbikes	Per cent of total vehicles that are motorbikes	GSRRS survey	Model B
Corruption index	Control of corruption index (units range from about -2.5 to +2.5 with higher values corresponding to better control of corruption	World Bank (13), International Futures database *(11)*	Model B
National policies for walking / cycling	Existence of national policies that encourage walking and / or cycling	GSRRS survey	Model C
Population	Total population (used as offset in negative binomial regression)	World Population Prospects 2012 revision (UNDESA) *(6)*	Models A, B, C

จำนวนผู้เสียชีวิต / 10,000 คันรถจ



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International

Road Safety Comparisons 2014
The Department of Infrastructure and
Regional Development,
Australian Government annual report

MICs 2.8

Fourth Speaker of <Session 2A>

Assoc. Prof. Dr. Pongrid Klungboonkrong
Sustainable Infrastructure Research and Development Center (SIRDC)
Faculty of Engineering, Khon Kaen University
E-mail: ponklung@gmail.com

Brief Biography:

Education:

1999:	*Ph.D. (Transport Systems Engineering), Transport System Centre (TSC), School of Geoinformatics Planning & Building, University of South Australia, AUSTRALIA*
1989:	*M.Eng. (Transportation Engineering), University of Manitoba, CANADA*
1984:	*B.Eng. (Civil Engineering), Khon Kaen University, THAILAND*

Positions & Experiences:

2014:	*World Bank International Consultant*
2013-present:	*Director of Excellent Center of Traffic and Transportation System Management in the Upper Northeastern region of Thailand, Khon Kaen University*
2007-Present	*Deputy Director for Administrative Affairs, SIRDC, Khon Kaen University*
2004-2005:	*Associate Dean for Research and International Affairs, Faculty of Engineering, Khon Kaen University*

Scholarship and Prize awarded:

-In 2009, Dr Pongrid Klungboonkrong received the best paper prize)Practical Paper(awarded by The Engineering Institute of Thailand under H.M. the King's Patronage at the 6th National Transport Conference, Thailand.

-In 2003, Dr Pongrid Klungboonkrong received the Thailand Transportation and Traffic Innovation Award 2003 form the Prime Minister organized by the Office of Transport and Traffic Policy and Plan)OTP(, Ministry of Transport.

-In 1999, Dr Pongrid Klungboonkrong was awarded the Yasoshima's Prize for the best paper at the 3rd Eastern Asia Society for Transportation Studies)EASTS (Conference, Taipei, Taiwan.

Thailand Road Safety Master Plan and Safe System Approach

By Assoc. Prof. Dr. Pongrid Klungboonkrong

Summary:

Based on a Global Status Report on Road Safety (WHO, 2015), Road Traffic Fatalities (RTF) analysis and comparisons for Asian countries were conducted. RTFs per population showed low correlation with GNIs per capita, but RTFs per population was moderately correlative with vehicles ownership. RTFs per vehicles illustrated high correlation with vehicles per population. Based on WHO (2015), Thailand was the 2rd rank in the world and the 1st rank in Asia. As GNI per capita increases, the proportion of 4-wheeled vehicles will rise and the portion of 2 wheeled (motorcycles) vehicles will decline. In Thailand, motorcycles were the main contributor to RTFs. In 2013, the road safety laws enforcement scores of Thailand would not meet the acceptable levels (8). Based on the Thailand (3 sources) RTFs, the best estimated RTFs were well matched with the estimated WHO (2015) RTFs. Thailand is unlikely to achieve RTFs (10.0) target. Based on the safe system principle and comprehensive literature reviews, road safety analysis as well as several intensive focus groups and direct interviews with road safety respondents both in regional cities and Bangkok, the urgent road safety actions for Thailand were proposed for immediate response and implementation.

The 10th ATRANS Annual Conference on
Transportation for a better life: Mobility and Road Safety Managements

Thailand Road Safety Master Plan and Safe System Approach

Pongrid Klungboonkrong

Sustainable Infrastructure Research and Development Center (SIRDC),
Faculty of Engineering, Khon Kaen University

Outlines

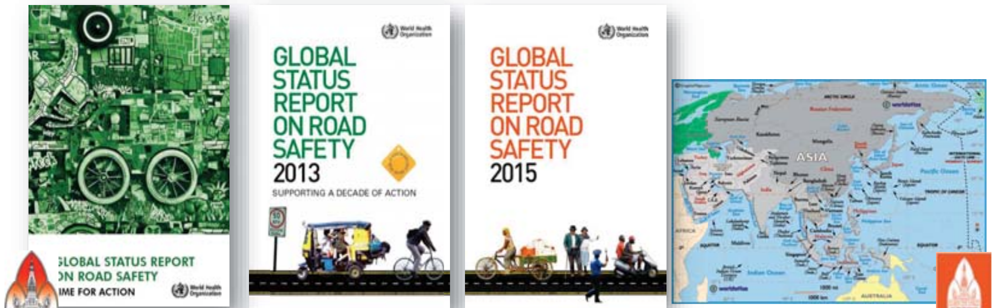
- Introduction
- Objectives
- Road safety analysis in Thailand and Asian countries
- Thailand road safety crisis
- Safe System Approach
- Urgent actions
- Conclusions

Objectives

(i) To review and analyze the current road safety status of Thailand and 44 Asian countries;
(ii) To analyze the road safety crisis in Thailand and
(iii) To propose urgent road safety actions.

Global Status on Road Safety for Thailand

- Based on the Global Status Report on Road Safety reported in WHO (2009, 2013 and 2015), Road Traffic Fatalities (RTFs) and other related matters of Thailand and 44 Asian countries were analyzed and compared.



Road safety status of 44 Asian countries based on WHO (2015)

NO.	COUNTRY/AREA	CODE	POPULATION NUMBERS FOR 2013	GNI PER CAPITA FOR 2013 IN US DOLLARS (*INCOME LEVEL)	NUMBER OF REGISTERED VEHICLES	ESTIMATED ROAD TRAFFIC DEATH	REPORTED ROAD TRAFFIC DEATH	ESTIMATED ROAD TRAFFIC DEATH RATE PER 100 000 POPULATION	REPORTED ROAD TRAFFIC DEATH RATE PER 100 000 POPULATION	ESTIMATED ROAD TRAFFIC DEATH RATE PER 1,000 VEH	REPORTED ROAD TRAFFIC DEATH RATE PE 1,000 VEH
1	AFGHANISTAN	AF	30,551,674	690 (L)	655,357	4,734	1,808	15.50	5.92	7.22	2.76
2	ARMENIA	AM	2,976,566	3,800 (M)	—	546	316	18.34	10.62	—	—
3	AZERBAIJAN	AZ	9,413,420	7,350 (M)	1,135,936	943	1,256	10.02	13.34	0.83	1.11
4	BAHRAIN	BH	1,332,171	19,700 (H)	545,155	107	83	8.03	6.23	0.20	0.15
5	BANGLADESH	BD	156,594,962	1,010 (L)	2,088,566	21,316	3,296	13.61	2.10	10.21	1.58
6	BHUTAN	BT	753,947	2,330 (M)	68,173	114	59	15.12	7.83	1.67	0.87
7	CAMBODIA	KH	15,135,169	950 (L)	2,457,569	2,635	1,950	17.41	12.88	1.07	0.79
8	CHINA (PEOPLE'S REPUBLIC OF)	CN	1,385,566,537	6,560 (M)	250,138,212	261,367	62,945	18.86	4.54	1.04	0.25
9	CYPRUS	CY	1,141,166	25,210 (H)	644,068	59	44	5.17	3.86	0.09	0.07
10	GEORGIA	GE	4,340,895	3,570 (M)	951,649	514	514	11.84	11.84	0.54	0.54
11	INDIA	IN	1,252,139,596	1,570 (M)	159,490,578	207,551	137,572	16.58	10.99	1.30	0.86
12	INDONESIA	ID	249,865,631	3,580 (M)	104,211,132	38,279	26,416	15.32	10.57	0.37	0.25
13	IRAN (ISLAMIC REPUBLIC OF)	IR	77,447,168	5,780 (M)	26,866,457	24,896	17,994	32.15	23.23	0.93	0.67
14	IRAQ	IQ	33,765,232	6,720 (M)	4,515,041	6,82	5,789	20.22	17.14	1.51	1.28
15	ISRAEL	IL	7,733,144	33,930 (H)	2,850,513	277	277	3.58	3.58	0.10	0.10
16	JAPAN	JP	127,143,577	46,330 (H)	91,377,312	5,971	5,679	4.70	4.47	0.07	0.06
17	JORDAN	JO	7,273,799	4,950 (M)	1,263,754	1,913	768	26.30	10.56	1.51	0.61
18	KAZAKHSTAN	KZ	16,440,586	11,550 (M)	3,926,487	3,983	3,233	24.23	19.66	1.01	0.82
19	KUWAIT	KW	3,368,572	45,130 (H)	1,841,416	629	473	18.67	14.04	0.34	0.26
20	KYRGYZSTAN	KG	5,547,548	1,210 (M)	958,187	1,220	1,184	21.99	21.34	1.27	1.24
	O PEOPLE'S MOCRATIC REPUBLIC	LA	6,769,727	1,450 (M)	1,439,481	971	908	14.34	13.41	0.67	

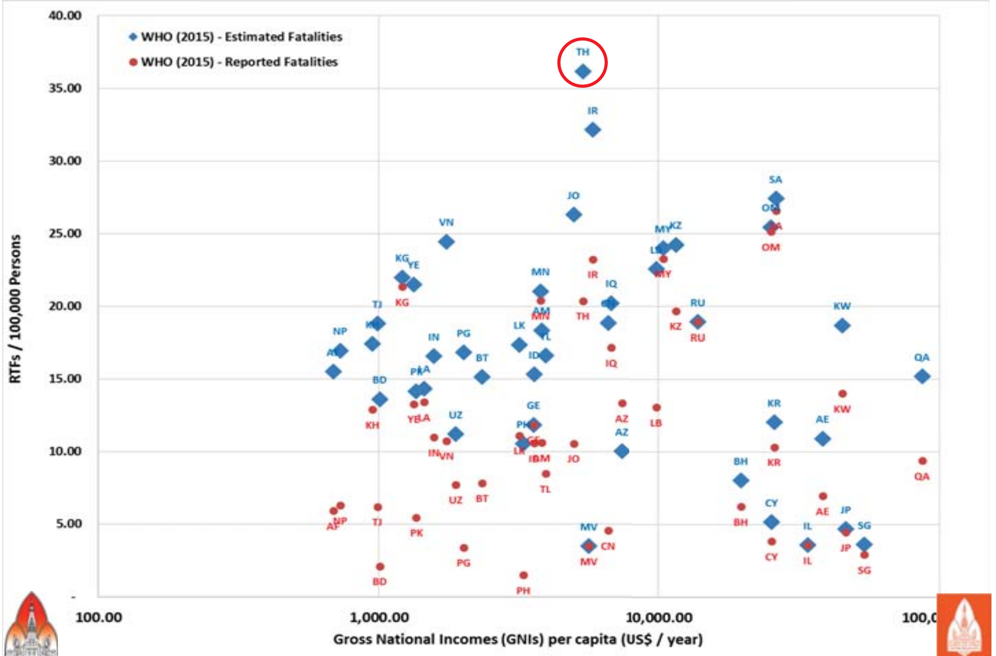
k: *Income level L = Low, M = Middle and H = High

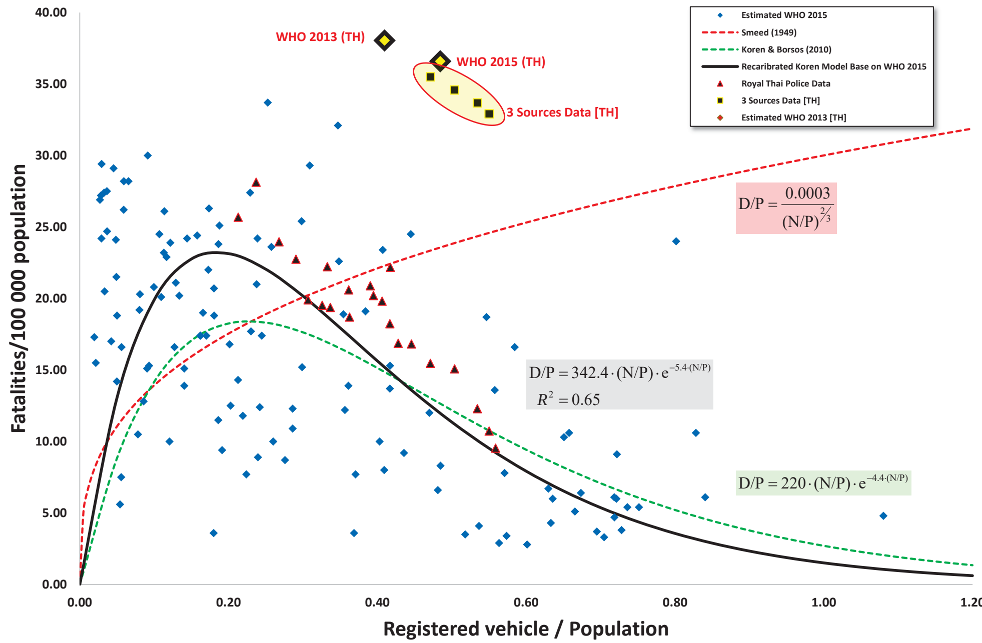
Road safety status of 44 Asian countries based on WHO (2015)

NO.	COUNTRY/AREA	CODE	POPULATION NUMBERS FOR 2013	GNI PER CAPITA FOR 2013 IN US DOLLARS (*INCOME LEVEL)	NUMBER OF REGISTERED VEHICLES	ESTIMATED ROAD TRAFFIC DEATH	REPORTED ROAD TRAFFIC DEATH	ESTIMATED ROAD TRAFFIC DEATH RATE PER 100 000 POPULATION	REPORTED ROAD TRAFFIC DEATH RATE PER 100 000 POPULATION	ESTIMATED ROAD TRAFFIC DEATH RATE PER 1,000 VEH	REPORTED ROAD TRAFFIC DEATH RATE PE 1,000 VEH
22	LEBANON	LB	4,821,971	9,870 (M)	1,680,011	1,088	630	22.56	13.07	0.65	0.37
23	MALAYSIA	MY	29,716,965	10,430 (M)	23,819,256	7,129	6,915	23.99	23.27	0.30	0.29
24	MALDIVES	MV	345,023	5,600 (M)	61,412	12	12	3.48	3.48	0.20	0.20
25	MONGOLIA	MN	2,839,073	3,770 (M)	675,064	597	579	21.03	20.39	0.88	0.86
26	MYANMAR	MM	53,259,018	-	4,310,112	10,809	3,612	20.30	6.78	2.51	6.78
27	NEPAL	NP	27,797,457	730 (L)	1,178,911	4,713	1,744	16.95	6.27	4.00	1.48
28	OMAN	OM	3,632,444	25,150 (H)	1,082,996	924	913	25.44	25.13	0.85	0.84
29	PAKISTAN	PK	182,142,594	1,360 (M)	9,080,437	25,781	9,917	14.15	5.44	2.84	1.09
30	PAPUA NEW GUINEA	PG	7,321,262	2,010 (M)	94,297	1,232	248	16.83	3.39	13.07	2.63
31	PHILIPPINES	PH	98,393,574	3,270 (M)	7,690,038	10,379	1,469	10.55	1.49	1.35	0.19
32	QATAR	QA	2,168,673	86,790 (H)	647,878	330	204	15.22	9.41	0.51	0.31
33	REPUBLIC OF KOREA	KR	49,262,698	25,920 (H)	23,150,619	5,931	5,092	12.04	10.34	0.26	0.22
34	RUSSIAN FEDERATION	RU	142,833,689	13,850 (H)	50,616,163	27,025	27,025	18.92	18.92	0.53	0.53
35	SAUDI ARABIA	SA	28,828,870	26,260 (H)	6,599,216	7,898	7,661	27.40	26.57	1.20	1.16
36	SINGAPORE	SG	5,411,737	54,040 (H)	974,170	197	159	3.64	2.94	0.20	0.16
37	SRI LANKA	LK	21,273,228	3,170 (M)	5,203,678	3,691	2,362	17.35	11.10	0.71	0.45
38	TAJIKISTAN	TJ	8,207,834	990 (L)	411,548	1,543	508	18.80	6.19	3.75	1.23
39	**THAILAND**	**TH**	**67,010,502**	**5,340 (M)**	**32,476,977**	**24,237**	**13,650**	**36.17**	**20.37**	**0.75**	**0.42**
40	TIMOR-LESTE	TL	1,132,879	3,940 (M)	63,553	188	96	16.59	8.47	2.96	1.51
41	UNITED ARAB EMIRATES	AE	9,346,129	38,360 (H)	2,674,894	1,021	651	10.92	6.97	0.38	0.24
42	UZBEKISTAN	UZ	28,934,102	1,880 (M)	—	3,240	2,231	11.20	7.71	—	—
43	VIET NAM	VN	91,679,733	1,740 (M)	40,790,841	22,419	9,845	24.45	10.74	0.55	0.24
44	YEMEN	YE	24,407,381	1,330 (M)	1,201,890	5,248	3,239	21.50	13.27	4.37	2.69

k: *Income level L = Low, M = Middle and H = High

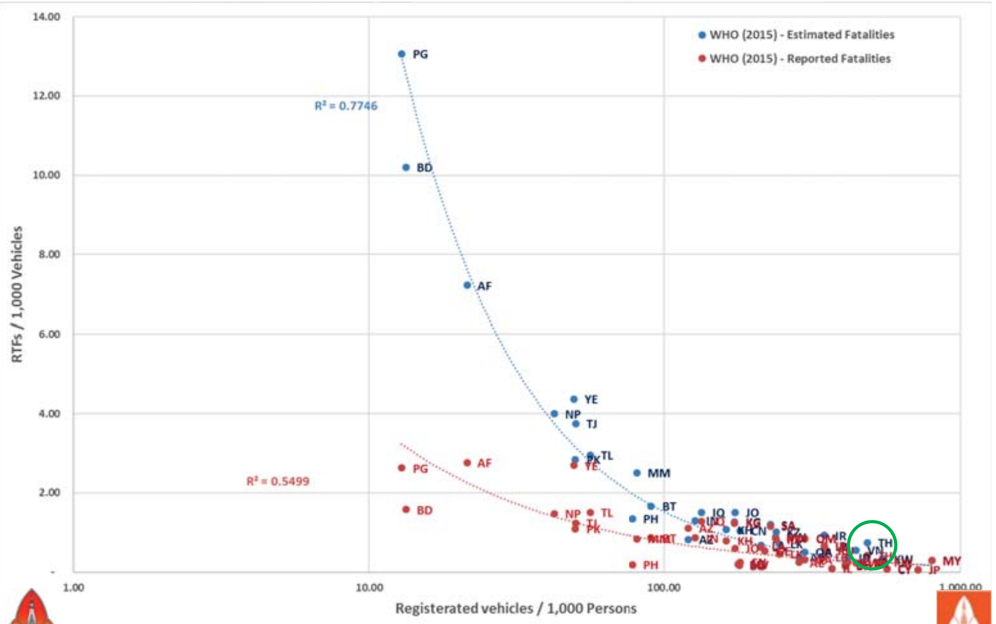
RTFs per 100,000 pop. vs GNI per capita (WHO, 2015)

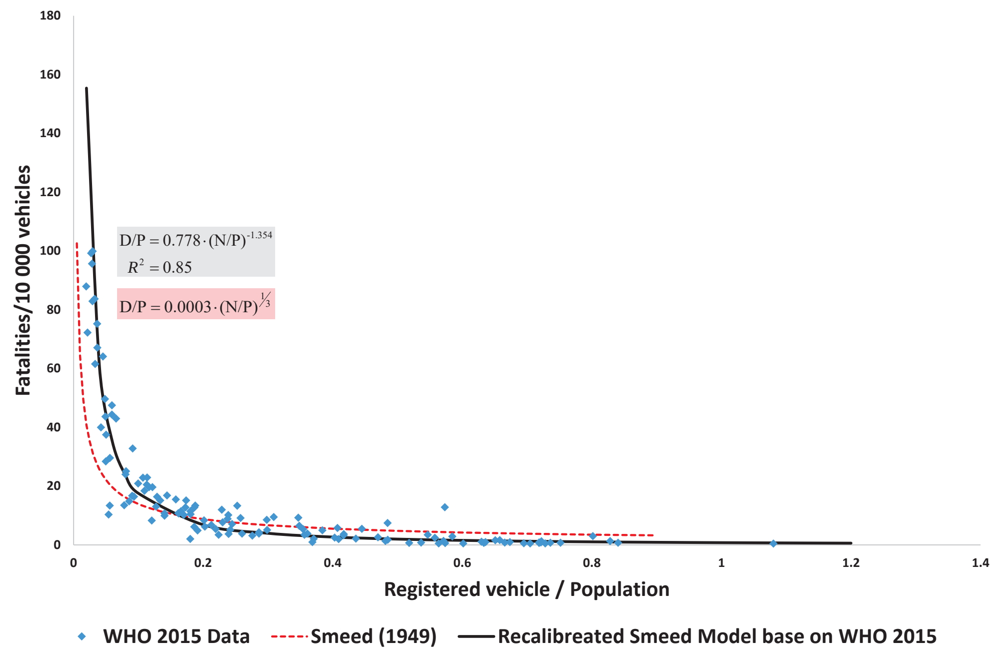




e: Smeed, R.J. (1949) **Some statistical aspects of road safety research**, Journal of Royal Statistical Society, Series A (General), Vol. 112, No. 1, 1949, pp. 1-34.
Koren C. and Borsos A. (2010) **IS SMEED'S LAW STILL VALID? A WORLD-WIDE ANALYSIS OF THE TRENDS IN FATALITY RATES.** Journal of Society for Transportation and Traffic Studies (JSTS) Vol.1, PP.64 - 76.

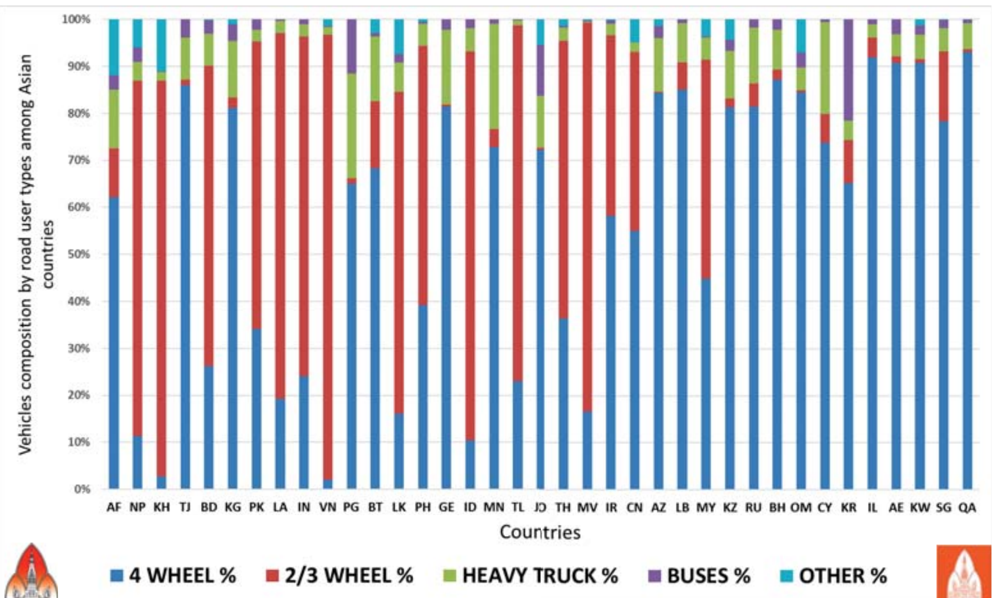
RTFs per 1,000 veh. vs vehicles per 1,000 pop. (WHO, 2015)



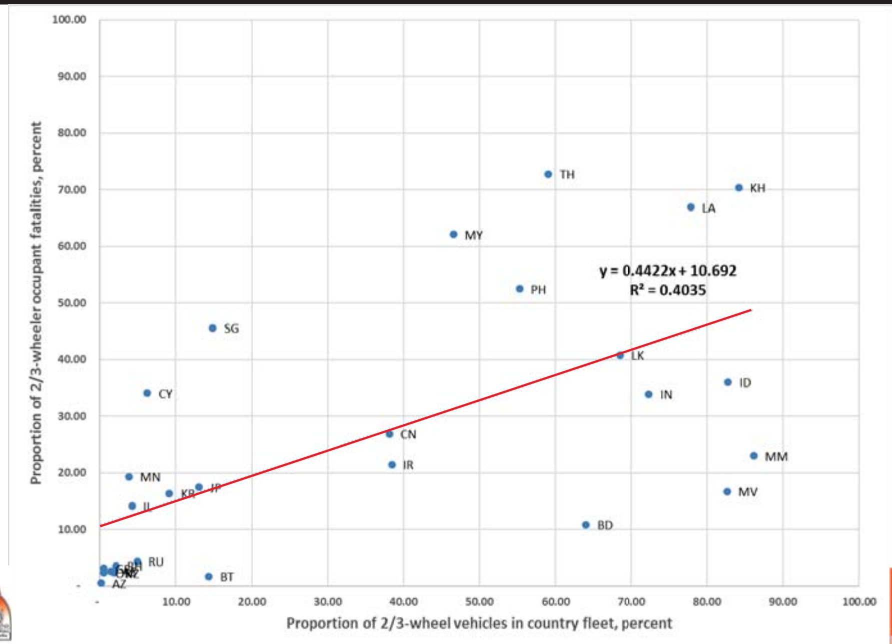


Smeed, R.J. (1949) **Some statistical aspects of road safety research**, Journal of Royal Statistical Society, Series A (General), Vol. 112, No. 1, 1949, pp. 1-34.
Koren C. and Borsos A. (2010) **IS SMEED'S LAW STILL VALID? A WORLD-WIDE ANALYSIS OF THE TRENDS IN FATALITY RATES.** Journal of Society for Transportation and Traffic Studies (JSTS) Vol.1, PP.64 - 76.

The Vehicles Composition among 44 Asian countries

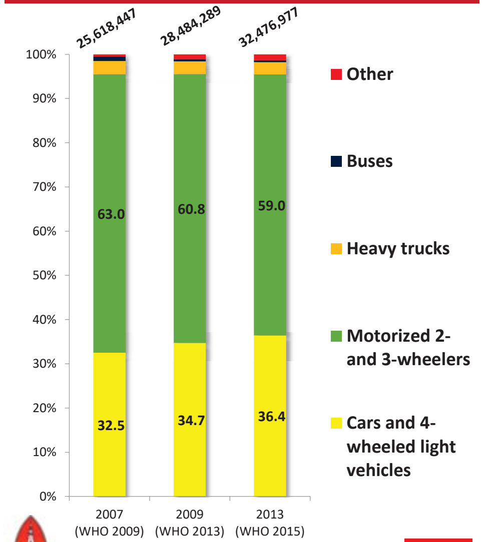


Proportion of 2/3-wheeler fatalities vs proportion of 2/3-wheeled vehicles in countries fleet

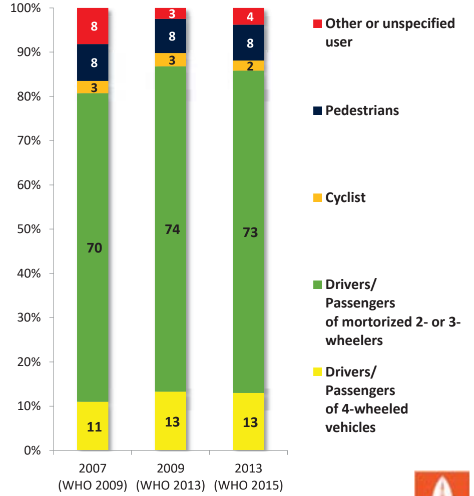


Vehicle Composition and RTFs Proportion by Road User Types

Vehicles Composition



Road Fatalities Proportion by Road User Types



: WHO (2009), WHO (2013) and WHO (2015)

THAILAND

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Motorcycle Infrastructures

Exclusive motorcycle lanes

Guardrail for motorcycles

U-Turn facility for motorcycles

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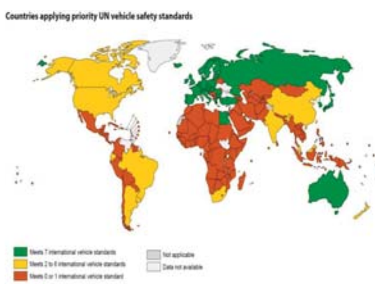
Motocycle Crash Barrier

Without Protection

With Protection

SIRDC

Global NCAP's road map for safer vehicles 2020



Source: Global Status Report on Road Safety 2015, WHO, 2015

Democratising Car Safety, Global NCAP, 2015

Road Map for Safer Vehicles 2020 UN Regulations* for:	All New Models Produced or Imported	All Vehicles Produced or Imported
Frontal Impact (No.94) Side Impact (No.95)	2018	2020
Seat Belt & Anchorages (No.16 & 14)	2018	2020
Electronic Stability Control (No. 140 / GTR. 8)	2018	2020
Pedestrian Protection (No.127 / GTR. 9)	2018	2020
Motorcycle Anti-Lock Brakes (No.78 / GTR. 3)	2018	2020
Autonomous Emergency Braking Systems	Highly Recommended	Highly Recom

*or equivalent national performance requirements, with effective conformity of production

Source: Save LIVES - A road safety technical package, WH

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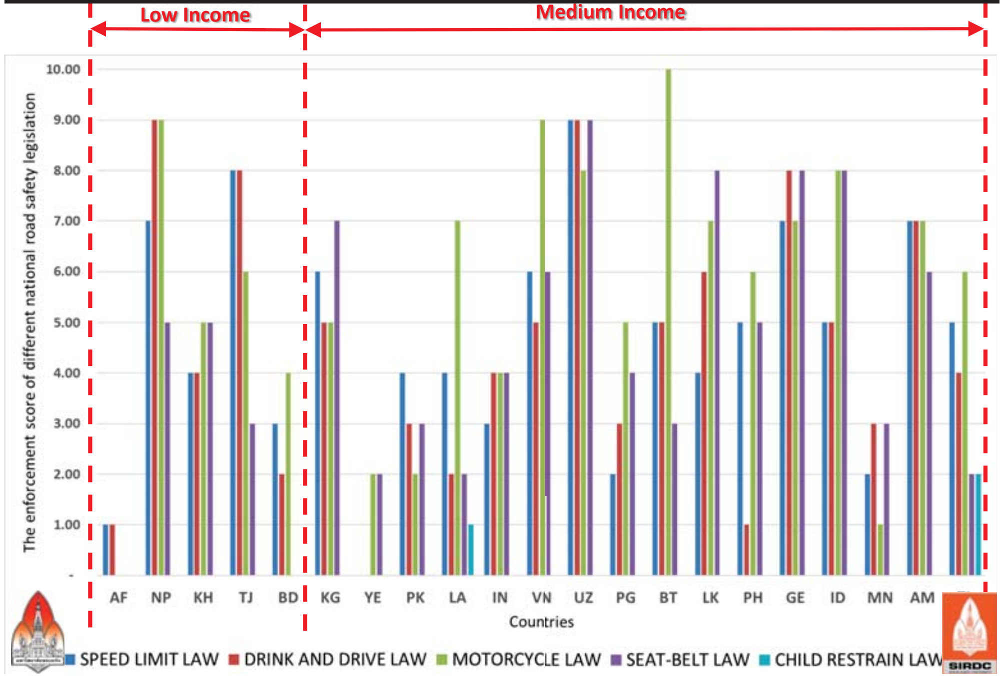
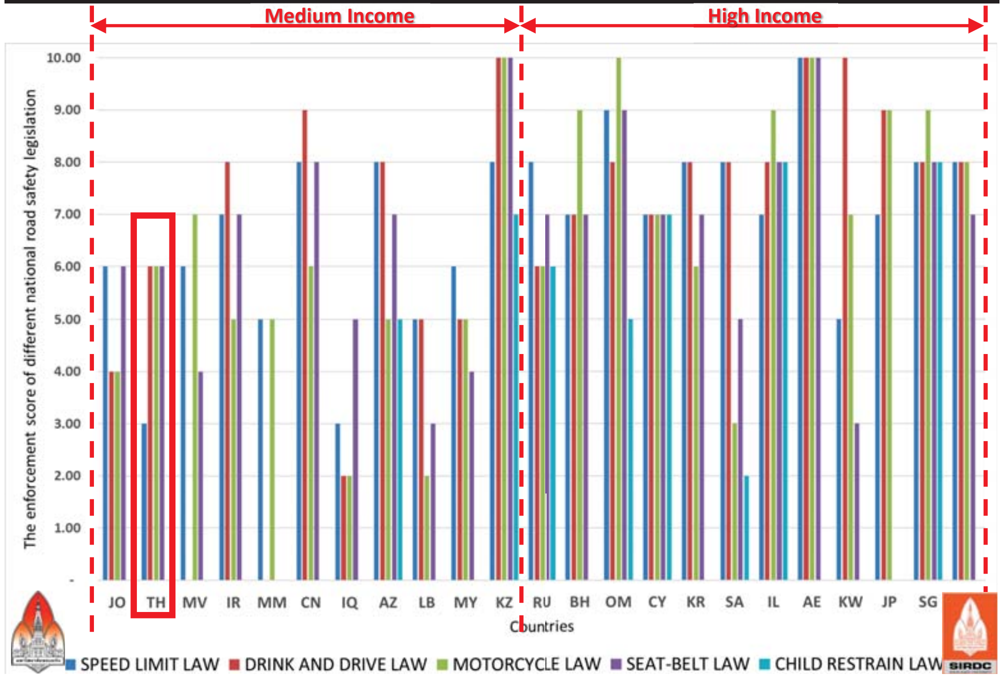
The enforcement score of different national road safety laws among ASEAN countries (WHO, 2015)

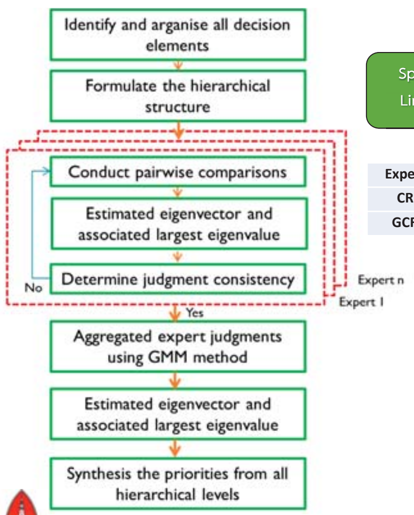


The enforcement score of different national road safety laws among ASEAN countries (WHO, 2015)

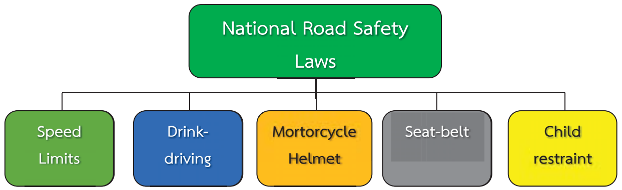


Analytic Hierarchy Process (AHP) Methodology

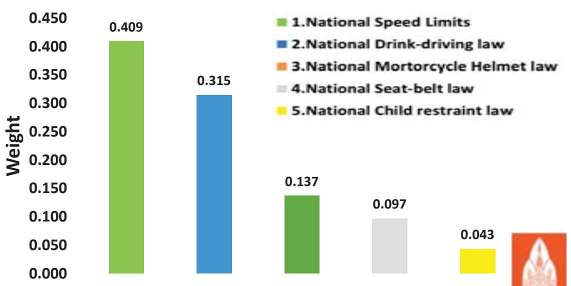
AHP methodology



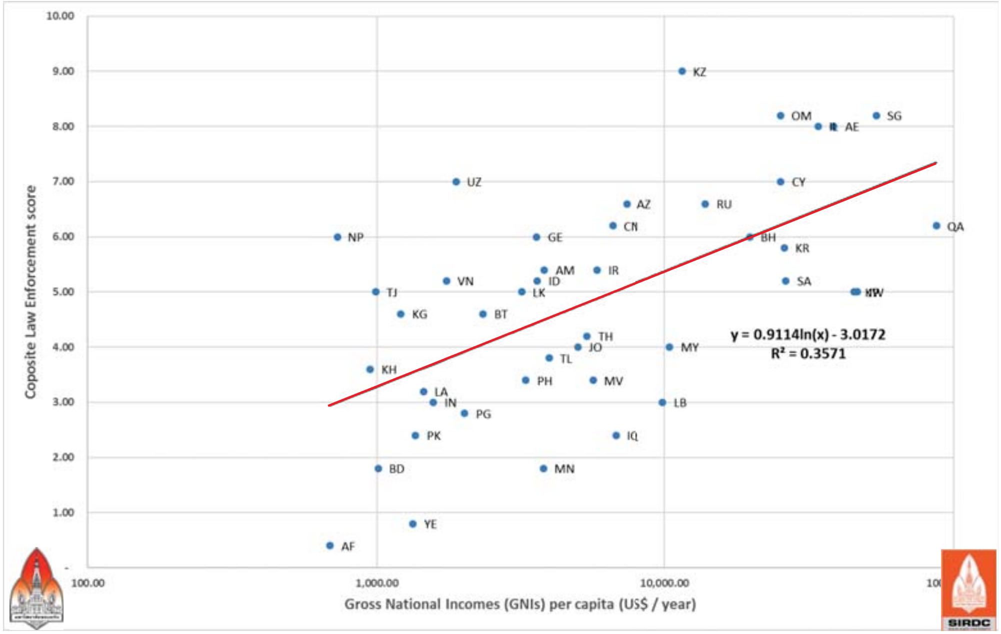
Laws related to road safety.



Expert	1	2	3	4	5	6	7
CR	0.021	0.041	0.054	0.043	0.028	0.028	0.031
GCR	0.025						



Relationship between Composite Enforcement scores vs GNI per capita



Road Safety Law Enforcement Scores

ark : NO National Child Restraint Law in THAILAND

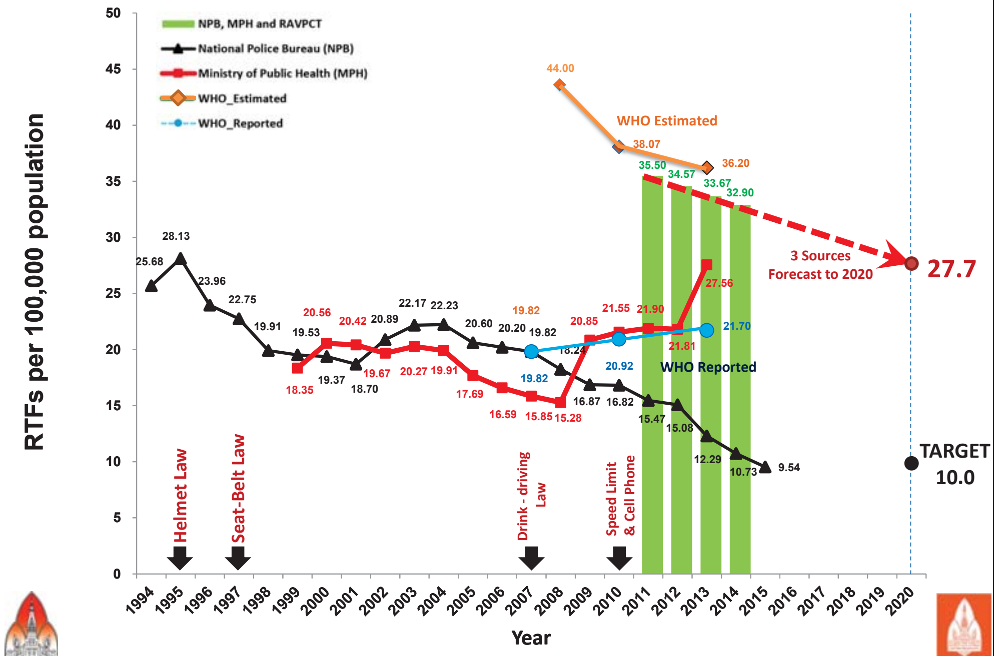
: WHO (2009), WHO (2013) and WHO (2015)

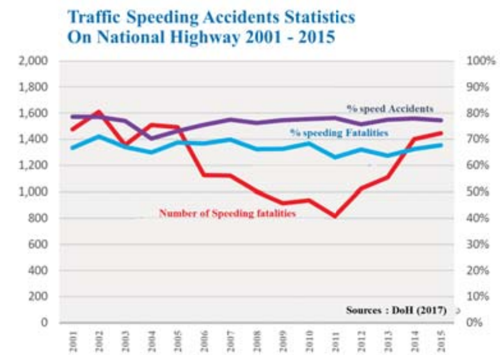
Thailand has legislative gaps in all risk factors except helmets (2016)

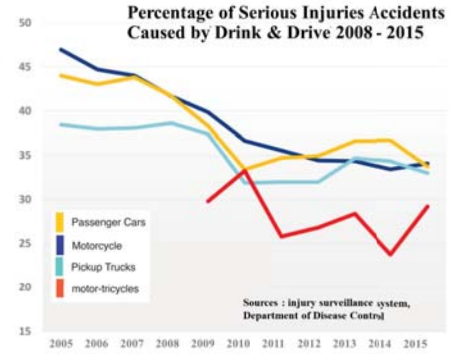
Speed	National speed laws in place	Speed limits on urban roads ≤ 50 km/h	Local authorities have the power to modify national speed limits			
Drink–driving	National drink-driving law in place	Drink – driving based on BAC or equivalent BrAC	BAC limit for general population ≤ 0.05 g/dl	BAC limit for young/novice drivers ≤ 0.02 g/dl		
Motorcycle helmets	National motorcycle helmet law in place	Law applies to motorcycle drivers and adult passengers	Law applies to all road types	Law applies to all engine types	Law requires helmet to be properly fastened	Law requires helmet to meet a national or international standard
Seat-belts	National seat-belt law in place	Law applies to front seat passengers	Law applies to rear seat passengers			
Child restraints	National child restraint law in place	Law is based on age-weight-height or a combination of these factors	Law restricts children under a certain age-height from sitting in front seat.			

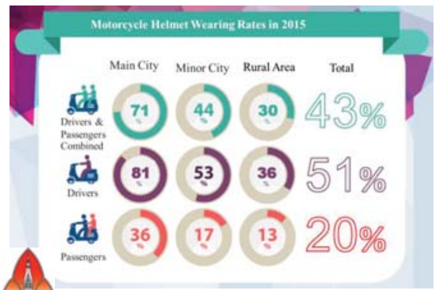
e: Save LIVES - A road safety technical package, WHO, 2017

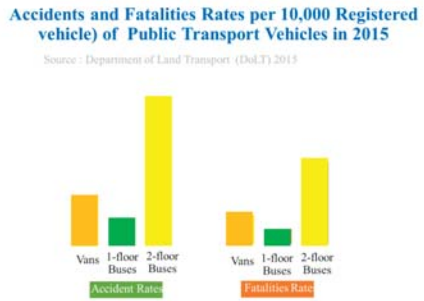
Road traffic Fatalities Risk in Thailand





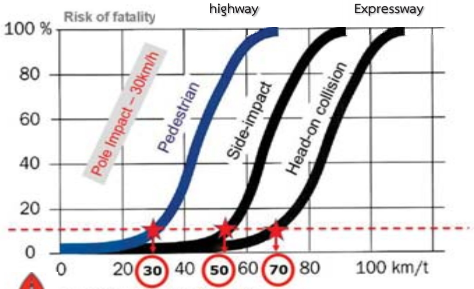






Setting Speed Limits

Speed cameras installation in KK

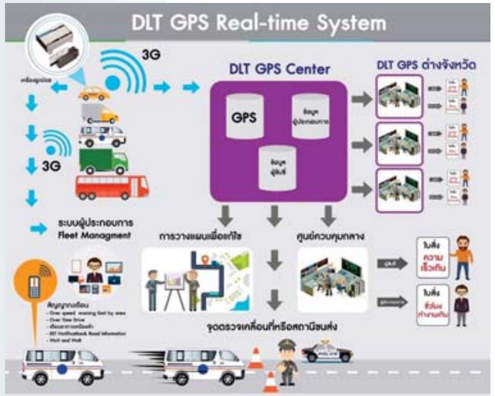


…borg Curves-a conceptual basis for …l management

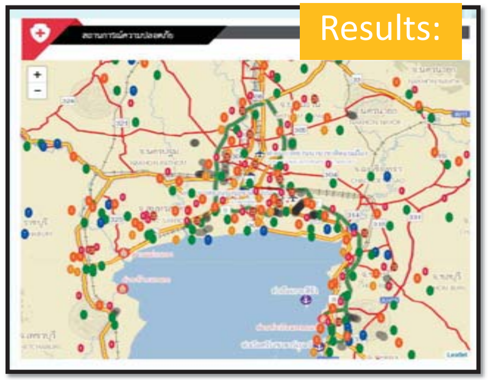
Safe System Speeds

Thailand GPS Center

System Design



Results:



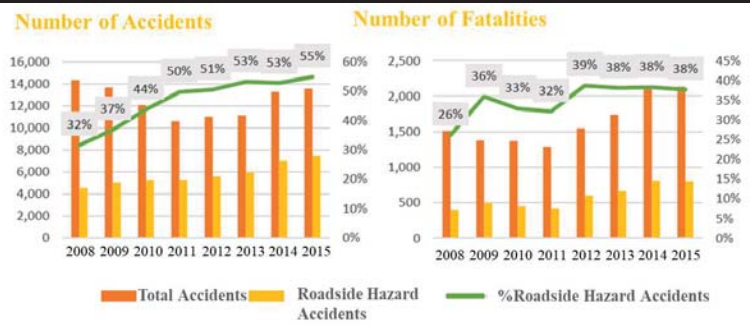
Safety Map

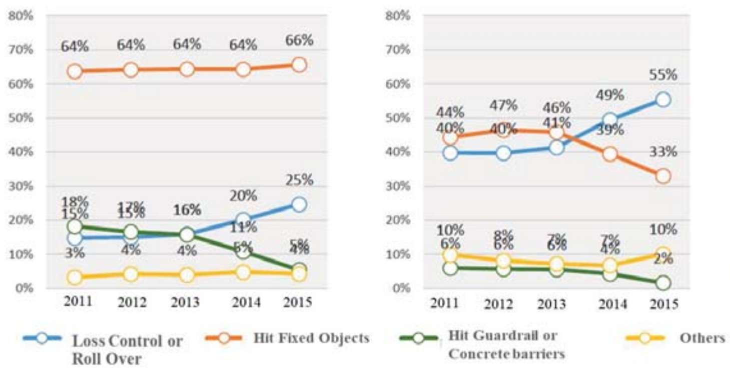
Summary result of all black spot during 1st November 2016 to 31st January 2017.

- *Overlap black spot 168*
- *Overspeed 251*
- *Overspeed intersect black spot 117*
- *Overtime driving 143*
- *Over driving intersect black spot 94*

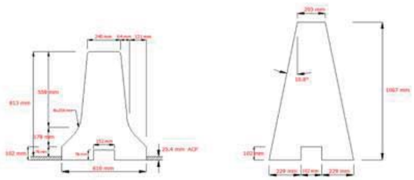
From the result, DLT inspector will know risk area and can perform proper solution.

Roadside Accidents





Rigid – New Jersey Barrier



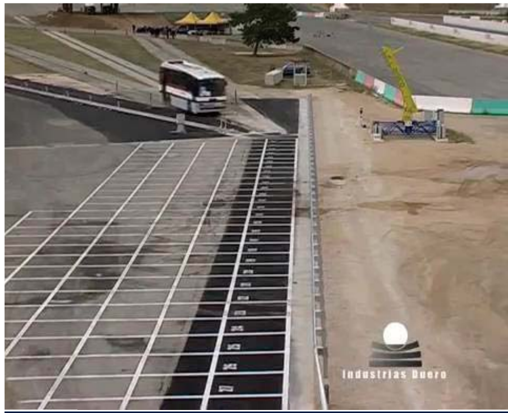
(a) F-shape concrete safety barrier (b) Single-slope concrete barrier

Test with Uncoated & Coated Jersey Barriers (VDO)

Uncoated Jersey Barriers (VDO)

Coated Jersey Barriers (VDO)

Truck & Bus Crash Barrier Test

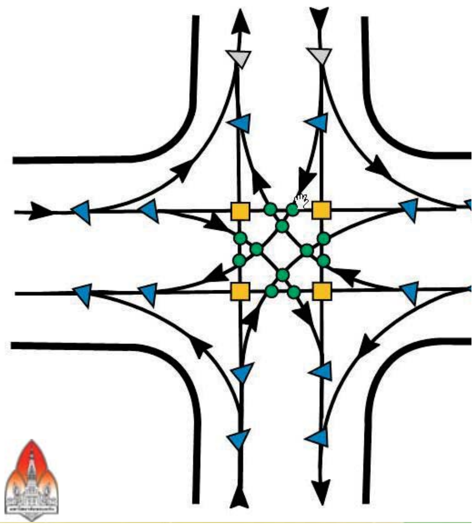


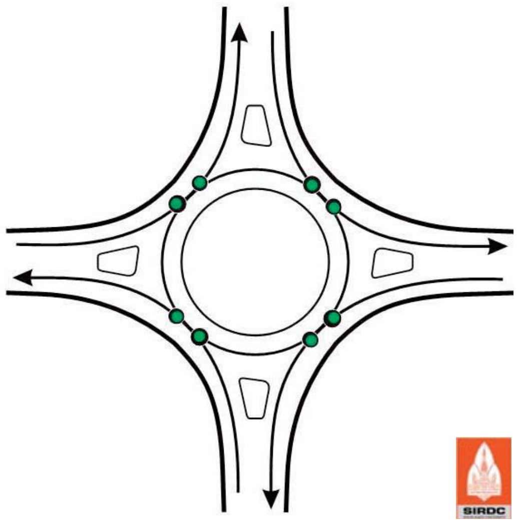
Crash barrier test for Bus

Crash barrier test for truck

Figure 6.16: Concrete pole (left) and slip-base pole (right)

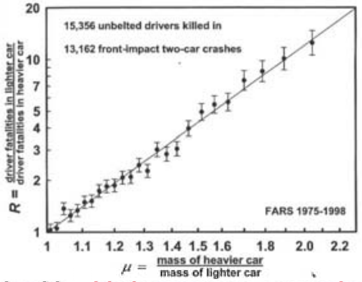
	Crossing	Turning	Merge/Diverge	Total	Typical Crash Rate per mil. entering veh
Full Access	4	12	16	32	0.3 (1)
Roundabout	0	0	8	8	0.2 (2)
Indirect Left Turn	0	4	20	24	0.1 (3)





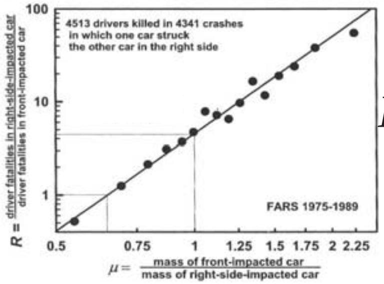
Effect of mass in two-car crashes

Crashes between pair of cars with unbelted driver crashing into each other head on



$$R = \mu^{3.58}$$

The drivers involved in side impact two car crashes.



$$R = \boxed{4.53}\mu^{3.47}$$

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Road safety-related SDGs and targets

SDG Goal 3: Ensure healthy lives and promote well-being for all at all ages

Target 3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents

SDG Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

Save LIVES - A road safety technical package, WHO, 2017

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Safe System Approach

The Safe System Approach is based on Sweden's Vision Zero strategy, which has the long-term vision of achieving no fatal or serious injuries within the transport system

Key Factors

- Speed
- Mass
- Impact configuration

Source: Safer roads, safer Queensland: Queensland's road safety strategy 2015–21. Department of Transport and Main Roads, Queensland Government, Australia

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Save LIVES: six components and 22 interventions

Acronym	Component	Interventions
S	Speed management	Establish and enforce speed limit laws nationwide, locally and in cities
		Build or modify roads which calm traffic, e.g. roundabouts, road narrowing, speed bumps, chicanes and rumble strips
		Require car makers to install new technologies, such as intelligent speed adaptation, to help drivers keep to speed limits
L	Leadership on road safety	Create an agency to spearhead road safety
		Develop and fund a road safety strategy
		Evaluate the impact of road safety strategies
		Monitor road safety by strengthening data systems
		Raise awareness and public support through education and campaigns
I	Infrastructure design and improvement	Provide safe infrastructure for all road users including sidewalks, safe crossings, refuges, overpasses and underpasses
		Put in place bicycle and motorcycle lanes
		Make the sides of roads safer by using clear zones, collapsible structures or barriers
		Design safer intersections
		Separate access roads from through-roads
		Prioritize people by putting in place vehicle-free zones
		Restrict traffic and speed in residential, commercial and school zones
		Provide better, safer routes for public transport
V	Vehicle safety standards	Establish and enforce motor vehicle safety standard regulations related to: seat-belts; seat-belt anchorages; frontal impact; side impact; electronic stability control; pedestrian protection; and ISOFIX child restraint points
		Establish and enforce regulations on motorcycle anti-lock braking and daytime running lights
E	Enforcement of traffic laws	Establish and enforce laws at national, local and city levels on: drinking and driving; motorcycle helmets; seat-belts; and child restraints
S	Survival after a crash	Develop organized and integrated prehospital and facility-based emergency care systems
		Train those who respond to crashes in basic emergency care
		Promote community first responder training

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The Master Plan on Road Accident Reduction of Ministry of Transport

Vision :
Transport System without Road Traffic Fatality (RTF)

Goal : *Reduction of RTFs per 100,000 population*
20 RTFs Per 100,000 population in 2022
10 RTFs Per 100,000 population in 2032
5 RTFs Per 100,000 population in 2042
0 RTFs Per 100,000 population in 2057

- Road safety management
- Safer roads and mobility
- Safer vehicles
- Safer road users
- Post – crash response

THE PROPOSED ROAD SAFETY URGENT ACTIONS

Pillars of the Plan	Proposed Action Plans
Road safety management	1. Develop the road safety master plan and action plans of Thailand and provide the appropriate budget schemes. 2. Amend the national road safety Acts (eg the speed limits and seat belt laws) and adopt the new rod safety Acts (eg child restraint law). 3. Promote road safety capacity development. 4. Develop global standard road safety database system. 5. Officially promote and implement in-depth crash investigation as the compulsory procedures for serious road accidents. 6. Establish the Road Safety Institute of Thailand
Safer roads and mobility	1. Establish the functional road hierarchy classification system of Thailand and set up the appropriate safe speed limits for different road classes in urban and rural areas. 2. Improve safer road design and construction for all road users, particularly for vulnerable road users (VRU). 3. Establish the safe system design standard for all motorcycles infrastructures and facilities 4. Implement road safety audits for all stages of road infrastructure development. 5. Conduct black spot treatments. 6. Manage roadside hazard and U-turn locations for all national highways. 7. Implement suitable traffic calming schemes for different road classes.

THE PROPOSED ROAD SAFETY URGENT ACTIONS

Pillars of the Plan	Proposed Action Plans
Safer vehicles	1. Adopt global basic vehicle design standards for safer vehicles (including front impact, side impacts, seat belt and child restraint, pedestrian protection, Electronic Stability Control (ESC), Anti locked Braking System (ABS) for cars and motorcycles and Autonomous Emergency Braking (AEB)) 2. Promote advanced information technologies and innovation safety devices for all types of road vehicles, particularly for public vehicles (eg public vans, one-floored and two-floored buses) and motorcycles. 3. Improve vehicle inspection practice. 4. Develop the structural and stability design global standard for all vehicle types, particularly commercial vehicles (eg articulated trucks), public vehicles (eg public vans, one-floored and two-floored buses) and motorcycles.
Safer road users	1. Campaign to promote safer driving behaviors. 2. Issue, adopt and enforce national road safety laws (including speed limits, drinking and driving law, motorcycle helmet law, seat belt law and child restraint law). 3. Adopt advanced information technologies and innovations to control driving behaviors and enforce the road safety laws (eg speed camera and red-light camera) 4. Improve the standard of driving license testing procedure, particularly for commercial vehicles, public vehicles and motorcycles.
Post – crash response	1. Establish pre-hospital care, trauma care and rehabilitation. 2. Develop ambulance network systems along the road networks in urban, suburban and rural areas.

Conclusions

- RTFs per populations showed low correlation with GNIs per capita, but RTFs per populations illustrated reasonably moderate correlation with vehicles ownership.
- The RTFs per vehicles illustrated high correlation with vehicles ownership.
- Based on WHO (2015), Thailand was the 2nd rank in the world and the 1st rank in Asia.
- Based on the Thailand (3 sources) RTFs, the best estimated RTFs were similar and closer to the estimated WHO (2015) RTFs.
- Thailand is unlikely to achieve WHO RTFs rate (10.0) target.
- The proposed urgent road safety actions for Thailand need immediate response and implementation.

THANKS FOR YOUR ATTENTION

Fifth Speaker of <Session 2A>

Mr. Sujin MUNGNIMIT
Director of Highways Safety Bureau,
Department of Highways, Ministry of Transport, Thailand
E-mail: sujin.doh@gmail.com

Brief Biography:

Sujin is the Director of Highway Safety Bureau, Department of Highways. He had 35 years experience in traffic planning and road safety management. His specialize is Blackspot Improvement . Sujin introduced a new model to identified blackspots called "Sequencial pacing Data Analysis Model" which Highway Department has stilled using . He involved in a number of projects of road safety and blackspots improvement. Sujin was also member of several committees in road safety and related fields. He has presented at many national and international conferences on his expert knowledge of Highway Safety. Sujin obtained a Master of Engineering in Traffic Engineering from Institute of Industrial Sciences, University of Tokyo.

Management of Road Safety on National Highways
By Mr. Sujin MUNGNIMIT

Summary:

Thailand has a big network of road. It covers a total length of approximately 467,220 kilometers. Within it, about 84,405 accidents happened in 2016. And they came with 8,369 deaths. This was then interpreted as 2.24 deaths per 10,000 registered vehicles. However, the Organization for Economic Co-operation and Development (OECD) stated that the internationally averaged value of deaths per 10,000 registered vehicles was 0.72. It can be said that the road safety in Thailand is a very important issue.

Focusing on road infrastructures, the Bureau of Highway Safety, Department of Highways has a mission to reduce the number of road accidents, deaths and injuries. It has different strategies related to those issues. Those are accident reduction, accident prevention, upgrade of road infrastructure standards and intelligent transport system.

The accident reduction strategy mostly deals with black spots. Black spots can be identified from accident data, from road users and from local offices of the Department of Highways. The accident prevention strategy is a proactive approach to the problem. This can be divided into road safety audit, use of road assessment index (RAI) which is an index to indicate safety level of road infrastructures and road safety activity programs where many types of infrastructures are installed or replace the old ones.

The standard upgrades strategy tries implementing novel solutions to the problem. If proven to be working during trial, they will then be used as normal standards. Examples of those solutions are profile markings, use of anti-skid road marking with words, optical speed bars, “Your Speed” signs, and red chevrons on barriers. The intelligent transport system strategy aims to use such system in for road management. Not only solving the safety problem, it will also help with congestion problem and post-accident management.

One of the most challenging times of each year in terms of road safety management is the Songkran or the Thai New Year festival. This takes place in mid April. In 2017, the number of accidents was 1,355. They resulted in 201 deaths and 1,593 injuries. Those accidents were analyzed. It was found that the five biggest causes are speeding (50%), crossing with improper gap (23%), drowsiness (5%), drunk driving (5%), and improper passing (5%).

For speeding, three suitable approaches to be used are traffic calming, warning systems, and enforcement. Examples are optical speed bars in Khao Plung, Uttaradit and red chevrons on barrier at Huai Tong Bridge in Phetchabun. Improper gap crossing can be dealt by speed management, sight distance increase, and road improvement.

Solutions to help with drowsiness were profile marking or shoulder rumble strips, guardrails or barriers, and, even though not a mission of the Department of Highways, the four-hour driving time regulation. To help with improper passing problems, signs bearing the message “Limited Sight Distance, Do not pass” were used mainly at downhill terrains. And for drunk driving, the police force has been taking a leading in enforcing the alcohol limit to drivers.

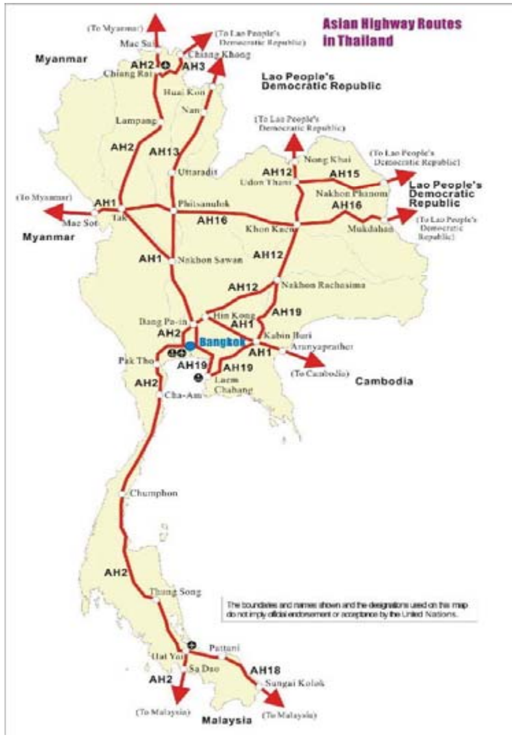
10th ATRANS Annual Conference on
"Transportation for Better Life : Mobility and Road Safety Management"
Friday 18 August 2017,Radison Blu Plaza Hotel Bangkok

Management of Road Safety on National Highways

Presented By

Sujin Mungnimit

Director of Highway Safety Bureau
Department of Highways
THAILAND



Road Network in Thailand

National Highway (Inc. Concession Rd. and Motorway)	66,940 Km.
Rural Road	47,916 Km.
Expressway	207.9 Km.
Municipality Road	352,157 Km.
ASIAN Highway	6,700 Km.

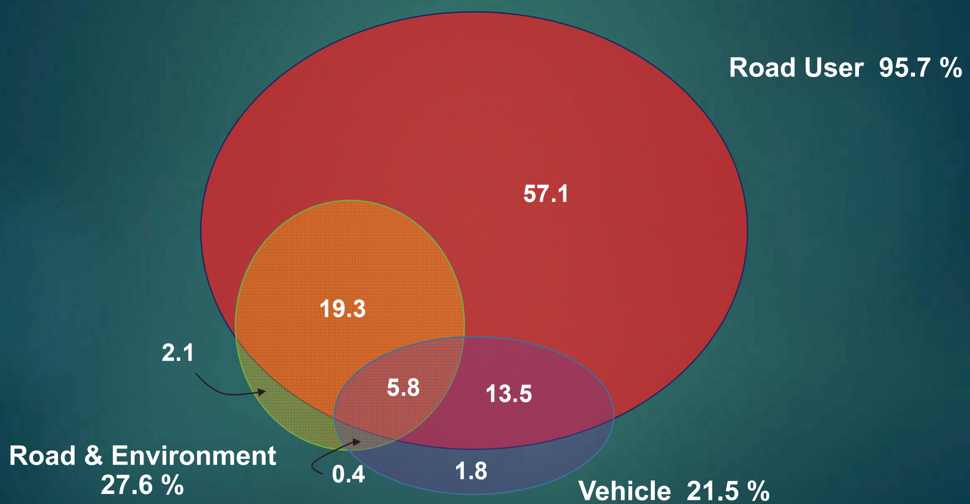
Accident Statistics 2016

Number of Accident	84,405
Fatality	8,369
Injury	15,365
Fatality/100,000 habitants	12.69
Fatality/10,000 Vehicle Registers	2.24

Fatality / 10,000 Vehicle registers

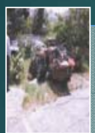
OECD 0.72
International
Road Safety Comparisons 2014
The Department of Infrastructure and Regional Development, Australian Government annual report
MICs 2.8

Causes of Accident in THAILAND



MOT Strategic Plan 2017-2021	BOHS Strategic Plan 2017-2021	DOH Strategic Plan 2017-2021
Upgrade of safety and security of Transport system	1. Accident Reduction	Highway Development for better connectivity, accessibility and mobility
	2. Accident Prevention	
Transport system development for boosting competitiveness and driving economy	3. Standard Upgrade	Improvement of safety level of highway network
	5. Intelligent Transport System	

1. Accident Reduction



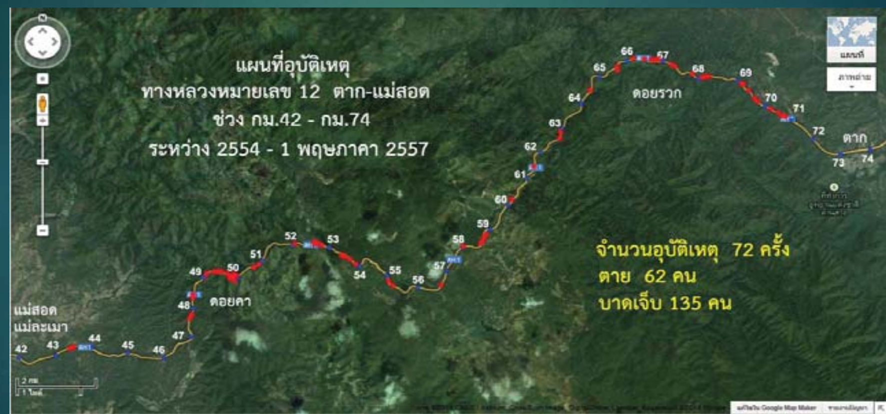
Black Spot Identification

Black Spot Information from Road User

Black spot Information from Local Office

Black Spot Improvement Activity

Base on Accident Data in 2016 No.of 3 times Accident Black Spots Is 145 Locations



2. Accident Prevention

- Road Safety Audit
- Road Assessment Index (RAI)

- Road Safety Activity Program

Road safety audit stages

Stage 1: Feasibility / Project Appraisal
Stage 2: Preliminary Design
Stage 3: Detailed Design
Stage 4: During Construction
Stage 5: Pre-Opening to traffic
Stage 6: Existing roads

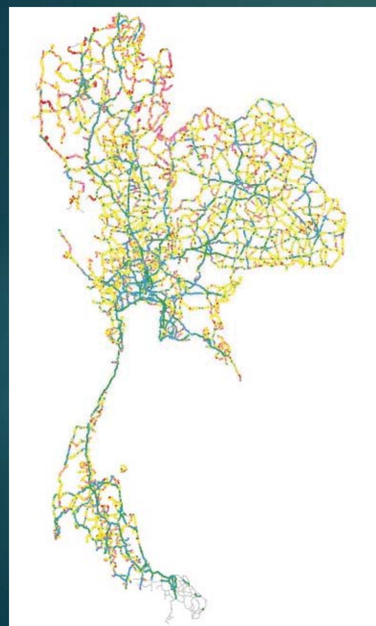
Road Safety Audits in Thailand

Opportunities
1. Road accidents become more interest issue for society
2. Government declare National Agenda for Road Safety

Treated
1. No Law and Regulation concern on Road Safety Audit
2. Engineer think that RSA spent more time and money
3. Lack of register auditors

Present status
1. RSA develop in large construction projects
2. Existing roads use Internal Audits
3. Other stages of RSA still pending

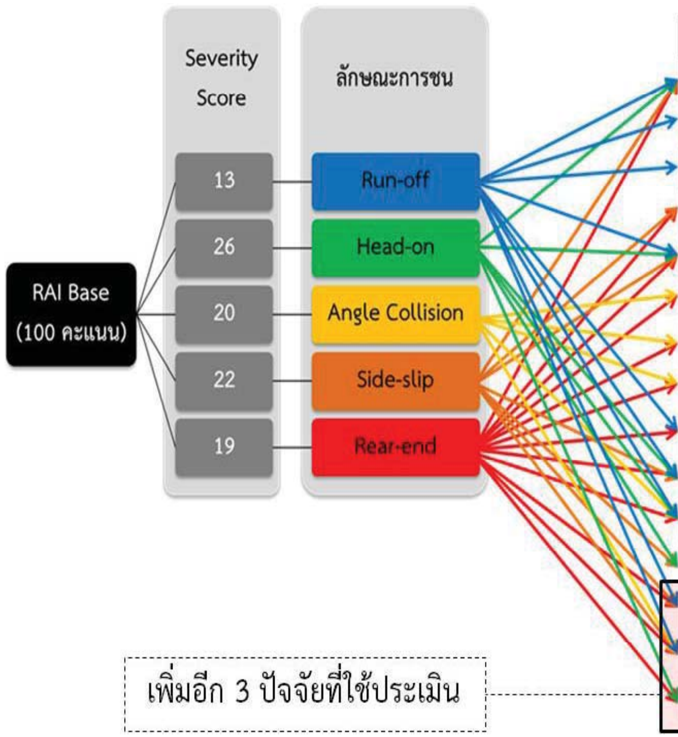
Road Assessment Index : RAI



ระดับความปลอดภัยกายภาพทางถนน	ช่วงคะแนน RAI	สี
★	0 - 20	สีแดง
★★	20 - 40	สีชมพู
★★★	40 - 60	สีเหลือง
★★★★	60 - 80	สีฟ้า
★★★★★	80 - 100	สีเขียว

iRAP = 2.93 | RAI เก่า = 100 | RAI ใหม่ = 96.98

12

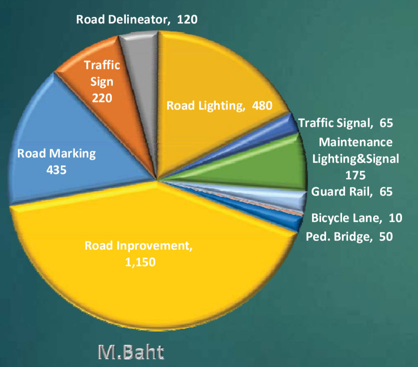


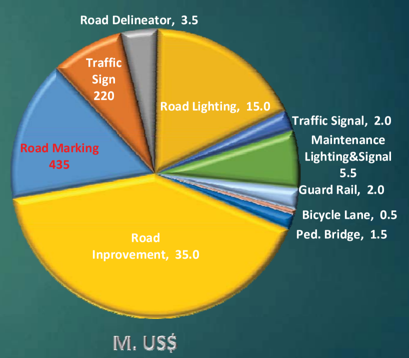
%ARF	ปัจจัยที่อาจก่อให้เกิดอุบัติเหตุ
30	ความกว้างช่องจราจร 3.5 เมตร
20	ความกว้างผิวไหล่ทาง 2.5 เมตร
40	สิ่งกีดขวางในระยะ 3 เมตร
25	ทางเชื่อม
40	ประเภททางโค้งและราวกันอันตรายในโค้ง
62	ทางแยก
25	ความยาวช่องทางรอเลี้ยว 100 เมตร
40	จุดกลับรถ
80	จุดตัดทางรถไฟ
35	การจัดการช่องทางจราจร
30	เส้นจราจรมองเห็นได้ชัดเจน
35	สภาพความเสียหายของผิวทาง
15	กิจกรรมข้างทาง
15	ป้ายเตือน/อุปกรณ์เตือนในบริเวณเสี่ยง
30	ระยะการมองเห็นบนโค้ง

Road Safety activities

1. Roadway Improvement
2. Installation of Guard Rails
3. Installation of Road Signs and Delineators
4. Traffic Paintings.
5. Installation of Traffic Signal and Roadway Lighting
6. Repaired of Traffic Signal and Roadway Lighting
7. Raised Pavement Markers
8. Pedestrian Bridges
9. Motorcycle and Bicycle Ways

Road Safety Activity Program





3. Standard Upgrade

Profile Maring / Audio Tactile Pavement Marking (ATP)

3. Standard Upgrade

"Use Low gear / Reduce Speed" Marking

3. Standard Upgrade

Optical Speed Bar (OSB)

3. Standard Upgrade

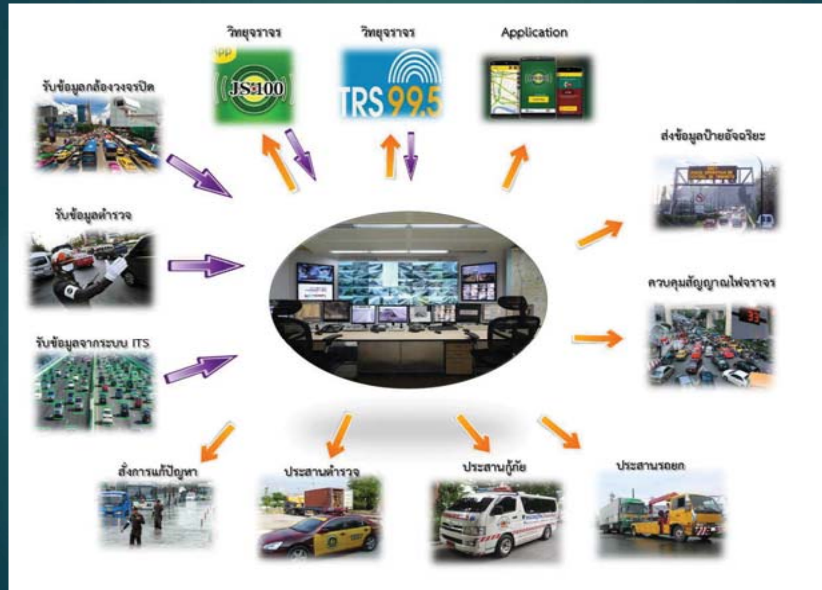
3. Standard Upgrade

Red Chevron on Barrier

3. Standard Upgrade

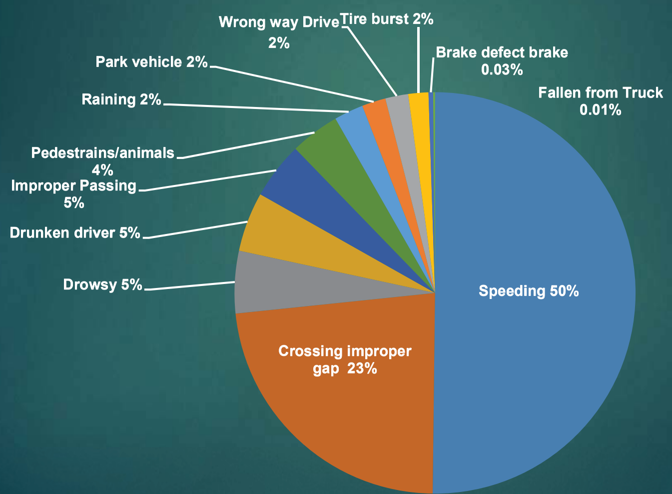
Your Speed Sign

5. Intelligent Transport System



Accident causes during 7 days of Songkran Festival 2017

No.of Accident 1,355 times Fatalities 201 victims Injuries 1,593 victims



Speeding 50%

Khao Plung ,Uttaradit

8% Grade downhill 5 kms.
Continuous 10 curve section
33 accidents in 2015

Khao Plung ,Uttaradit

“Use Low gear / Reduce Speed” Marking

Khao Plung ,Uttaradit

Red Rumble Strips

Khao Plung ,Uttaradit

Optical Speed Bar (OSB Marking)

Khao Plung ,Uttaradit

Your Speed Sign Board

Khao Plung ,Uttaradit

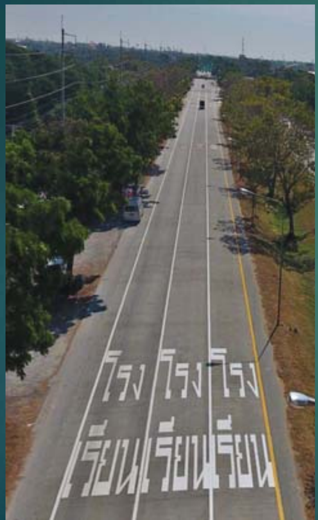
Your Speed Sign Board

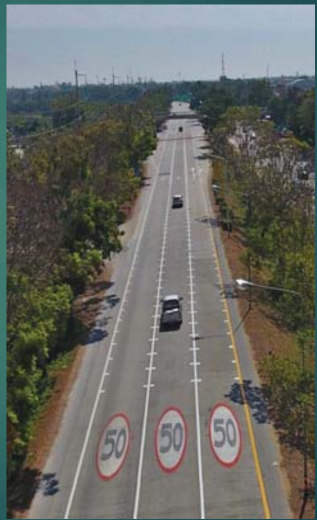
Huai Tong Bridge ,Phetchabun

Huai Tong Bridge ,Phetchabun

School Zone in Suphan Buri

School Zone and Speed Zone Marking





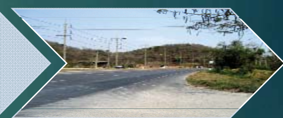
TESCO Supermart, Khon Kaen

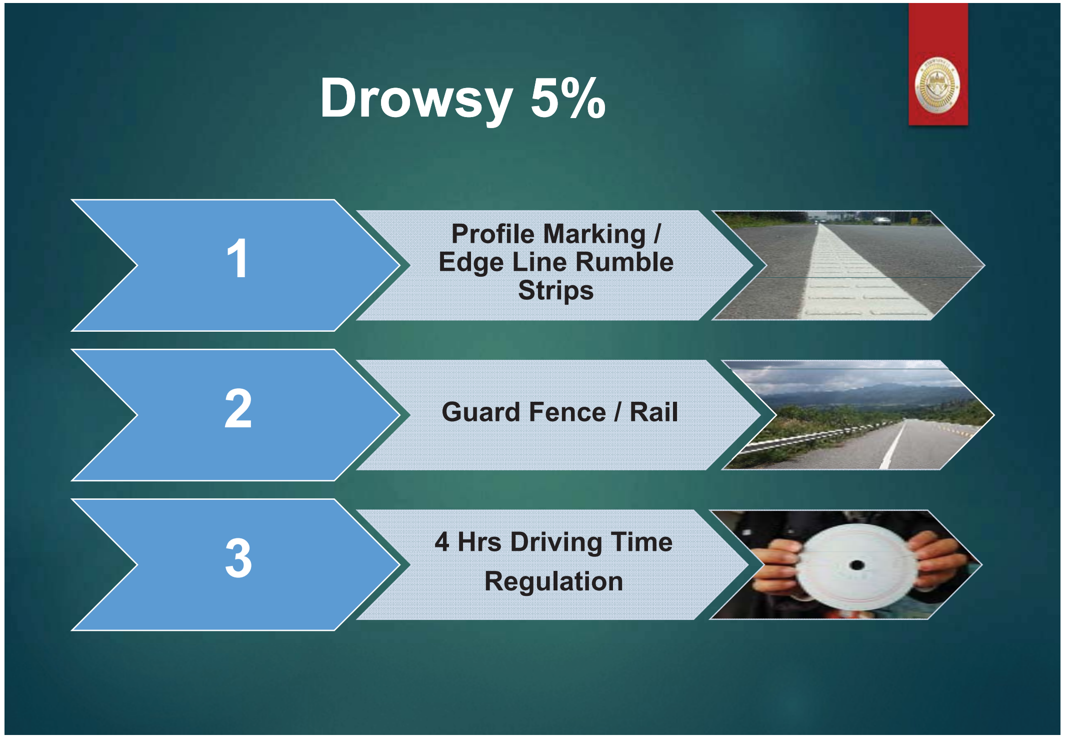
Speed Zone

Crossing improper gap 23%

Crossing improper gap 23%

1. Speed Management
2. Clear Sight Distance
3. Road Improvement




Drowsy 5%
1
Profile Marking / Edge Line Rumble Strips
2
Guard Fence / Rail
3
4 Hrs Driving Time Regulation


Profile Marking (ATP Marking)

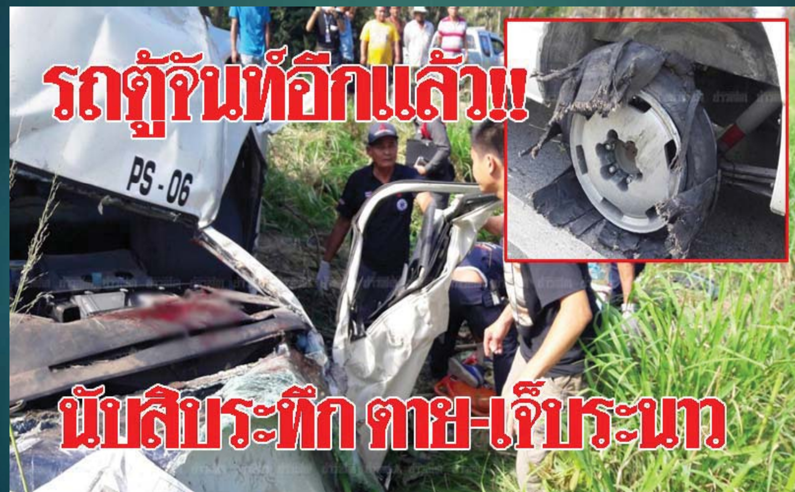
Improper Passing 5%

Limited Sight Distance
No Passing Sign

Drunken driver 5%

Alcohol Check Point 0.05 mg%

Tire burst 2%




THANK YOU FOR YOUR ATTENTION
sujin.doh@gmail.com

< 2nd AFTERNOON SESSION >

Session 3: Parallel Session of Main Annual Conference (Symposium)

Session 3A: Smart Mobility ***(Transport infrastructure and Transit Oriented Development- TOD***
Moderated By *Prof. Dr. Agachai Sumalee* *Hong Kong Polytechnic University, Hong Kong*
Hybrid Land Use for the Urban Expressway Development *By Mr. Kenji OGURA* *Senior Director, Hanshin Expressway Co.,Ltd., Japan*
Research & Development for Smart Mobility in Hong Kong *By Prof.Dr William H.K. Lam* *Hong Kong Polytechnic University, Hong Kong*
Transport infrastructure and Regional Development for Smart Mobility: *From the HSR Experience of Japan* *By Mr. Hirouki MIZUI* *JICA Expert for High Speed Rail Study Project, Thailand*
Walkable Environment for Smart Mobility and Transit Oriented Development- TOD *By Prof.Dr. Atsushi FUKUDA* *Nihon University, Japan*
Ride - Sharing for Smart Mobility *By Dr. Sumet Ongkittikul* *Thailand Development Research Institute (TDRI) Foundation, Thailand*

Moderator of <Session 3A>

Professor Agachai Sumalee, PhD
Director of Smart City Research Center,
King Mongkut's Institute of Technology Ladkrabang.
Professor, Department of Civil and Environmental Engineering,
The Hong Kong Polytechnic University.
E-mail: asumalee@gmail.com (www.agachai-sumalee.com)

Brief Biography:

Prof. Agachai Sumalee holds B.Eng in Civil Engineering (King Mongkut's Institute of Technology Ladkrabang, KMITL), MSc (Eng) and PhD in Transportation Planning and Engineering (ITS, Leeds University). He was previously Senior Research Fellow at University of Leeds, Associate Professor at Hong Kong Polytechnic University, and Visiting Professor at University of Tokyo. He is currently the Director of Smart City Research Center at KMITL. He is also a Professor at Hong Kong Polytechnic University. His research areas are intelligent transport system (ITS), network modelling, transport economics, and transport policy. Dr. Sumalee has published more than 90 journal papers in top peer-reviewed journals. In 2014 he is ranked as the second most influential researcher in the world in the field of transportation engineering in the last five years by the Microsoft Academic Research Database. He has received several prizes and awards including the 2014 APEC Science Prize for Innovation, Research and Education ("ASPIRE") awarded by Asia Pacific Economic Cooperation (APEC), Hans Jürgen Ewers Prize for outstanding research in infrastructure economics, Annual best paper award by Hong Kong Institute of Engineer, the Smeed Prize, and twice outstanding paper awards at the EASTS conferences in Fukuoka and Bangkok. He is currently the Editor in Chief of SCI journal Transpormetrica B: Transport Dynamics, Associate Editor of Networks and Spatial Economics, and Editorial Board Member of Transportation Research Part B, Transportation, Transportmetrica A, and Journal of Advanced Transportation.

Dr. Sumalee has served on several government committees. He is currently the Vice-Chair and Secretary General of Railway Committee of Engineering Institute of Thailand, member of the US Transportation Research Board Network Modelling Committee, and member of Hong Kong Transportation Road Safety Board. He served as a member of sub-committee of Railway System of the State Railway of Thailand, sub-committee of Land Development Committee (Expressway Authority of Thailand), Business Development Committee (Mass Rapid Transit Authority of Thailand), and Innovation and Information Technology Committee (National Housing Authority of Thailand). Dr. Sumalee is an active and leading developer of the Intelligent Transportation System in Thailand in which he led the deployment of the first fully automated ITS system for expressway corridor in Thailand and development of the ITS for Motorway network of Department of Highway. He also led the team to develop the ITS solution for the All Thai Taxi for automatically operating the whole 550 fleet of taxis. Recently he also led the team to develop the national data centre for GPS data from commercial and public vehicles in Thailand which was designed to receive and analyse the GPS data from up to 1 million vehicles on the real-time basis. This system is now the national system for Department of Land Transport.

First Speaker of <Session 3A>

Mr. Kenji OGURA
Senior Director, Japan Expressway International Co. Ltd.
(Hanshin Expressway Co. Ltd.)
E-mail: k.ogura.aa@jexway.jp/kenjiogura2@gmail.com

Brief Biography:

Education

1986	*BA in Economics, University of Shiga*
1998	*1999 Research Fellow, Department of Urban Planning, University of Washington, Seattle in WA, USA*
2000	*Research Fellow, Washington State Department of Transportation*

Professional Background

1986~1998	*ROW Department, Hanshin Expressway Public Corporation(HEX)*
2000~2003	*Chief, Management Planning Department, HEX*
2003~2005	*Sub Manager, Environment Division, HEX*
2006~2010	*Manager, ROW Division, HEX*
2011~2015	*Director, International Affairs Office, HEX*
2012	*JICA Expert, Kingdom of Cambodia*
2015	*Senior Director, Japan Expressway International Co. Ltd.(JEXWAY) Liaison Officer of JEXWAY sent by HEX*

Hybrid Land Use for the Urban Expressway Development
By Mr. Kenji OGURA

Summary:

Objectives of the Paper

This paper proposes utilization of hybrid land use; so-called three-dimensional Right-of-Way (3-D ROW) development for urban infrastructure projects by reallocating urban space to both private and public ownership within the local community where project affected person(PAPs) live. Involuntary resettlement is unavoidable when developing an urban transportation (e.g., expressway, mass-transit system) in a highly dense city; thus, 3-D ROW approach gives an effective solution to develop urban transportation projects, minimize involuntary resettlement and restore livelihood of PAPs in an overpopulated city.

Methodology

Hanshin Expressway (HEX) plays a crucial role in sustaining logistics and mobility in the Kansai metropolitan region of Japan. The author was involved in the 3-D ROW projects as a resettlement manager of HEX company limited and has exemplified the following project cases; the shopping mall under the urban expressway, the off-ramp penetrating a privately-owned building, and the community development by means of land readjustment on the high-grade dike under which Hanshin Expressway runs through. This paper examines the legal framework to promote both urban transportation infrastructure development and urban resettlement with the idea of an effective solution in a highly dense urban area.

Discussion Topics

- *Resettlement Impact and Livelihood Restoration of the Urban Community*

Are there any specific difficulties to relocate PAPs and restore livelihood in urban communities?

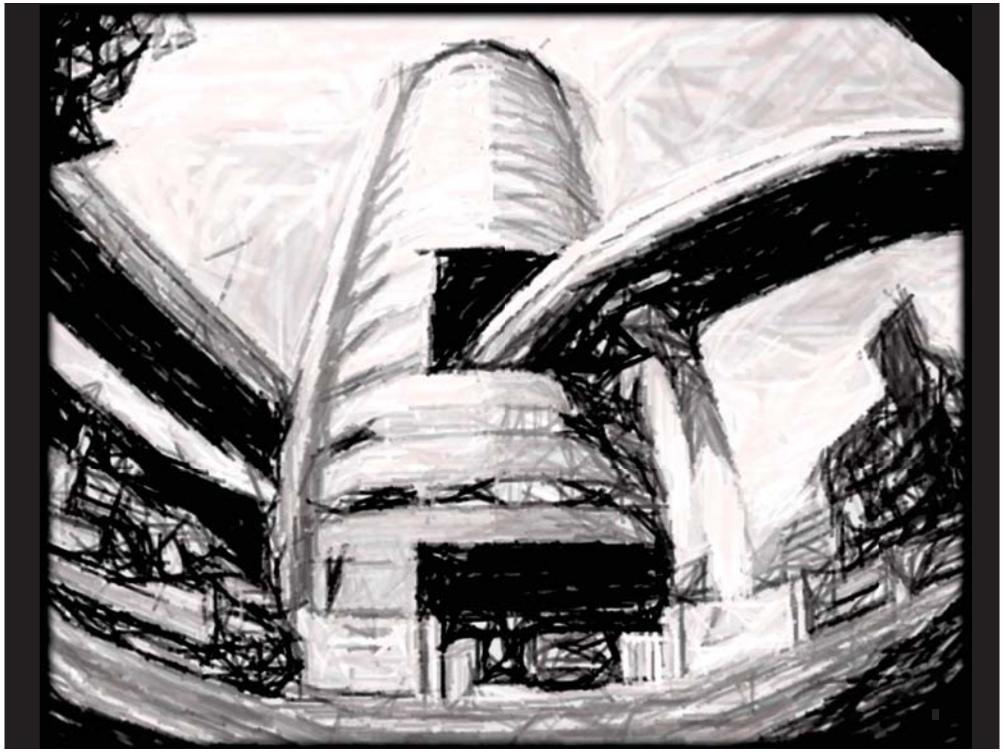
- *Development/Amendment of the Legal Framework including Land Law, ROW Law, Building Standard Law, and etc.*

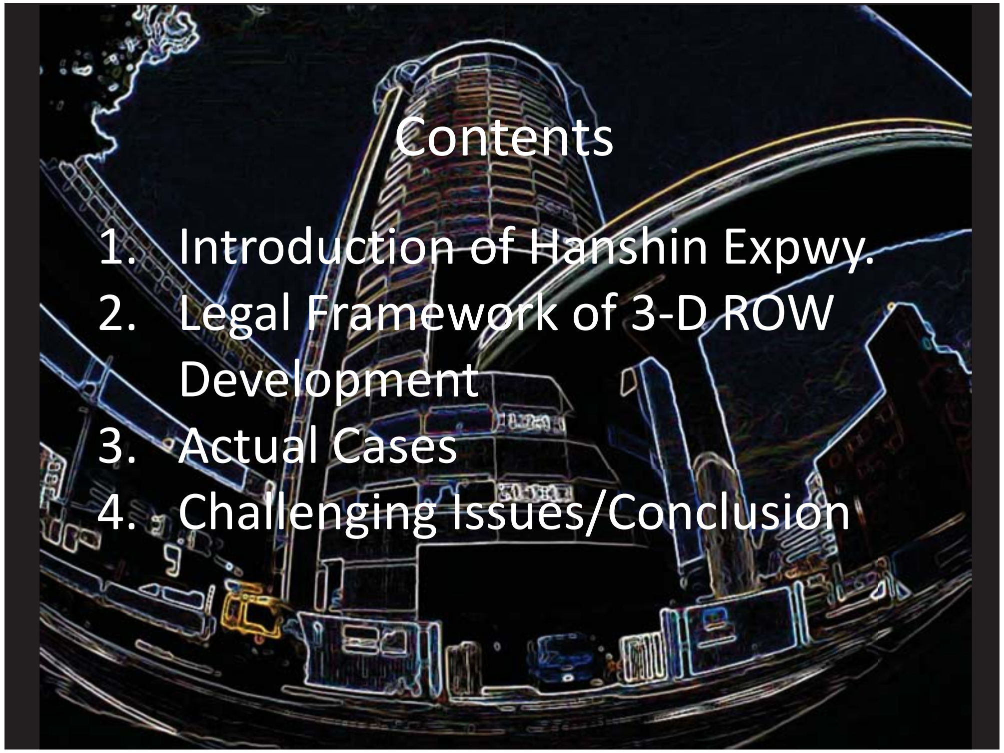
Are private premises allowed to use the area of ROW?
Is a land use limited for a single purpose (e.g., road for road, residence for residence) in your country?

- *Localization/Application in major Asian cities*

Major cities in Asian countries are struggling serious traffic congestion; thus, they need to develop a mass-transit system and urban expressway network to alleviate the traffic jam. Does the 3-D ROW approach help solving the issue?


Hybrid Land Use
For the Urban Expressway
Development
August, 2017
@BKK, Thailand
OGURA, Kenji
ATRANS
ASIAN TRANSPORTATION RESEARCH SOCIETY
Hanshin
Expressway




Contents
1. Introduction of Hanshin Expwy.
2. Legal Framework of 3-D ROW Development
3. Actual Cases
4. Challenging Issues/Conclusion

Commercial City, OSAKA

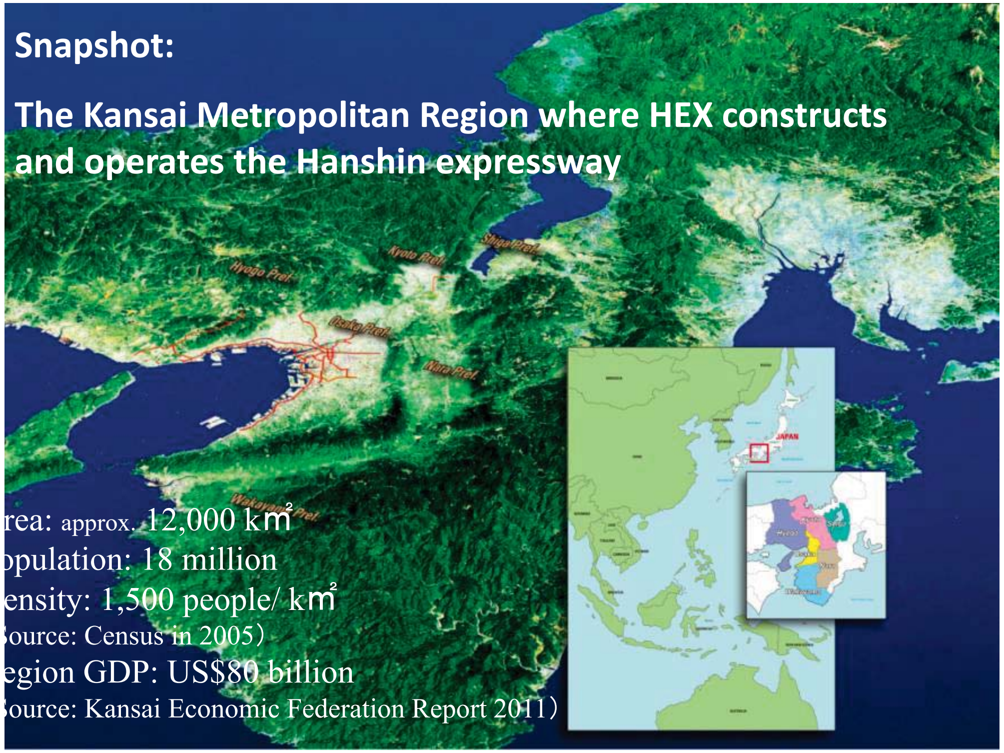
Port City, KOBE

Ancient Capital City, KYOTO

Hanshin Expressway

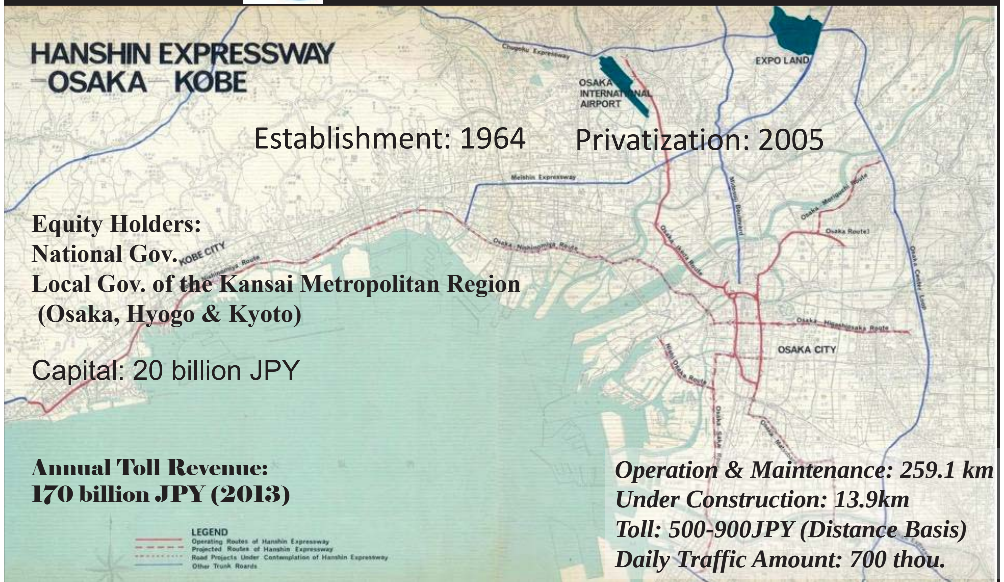
Snapshot:

The Kansai Metropolitan Region where HEX constructs and operates the Hanshin expressway



rea: approx. 12,000 km²
opulation: 18 million
ensity: 1,500 people/ km²
ource: Census in 2005)
egion GDP: US$80 billion
ource: Kansai Economic Federation Report 2011)

WHO are we?; Hanshin Expressway Co. Ltd.



Establishment: 1964

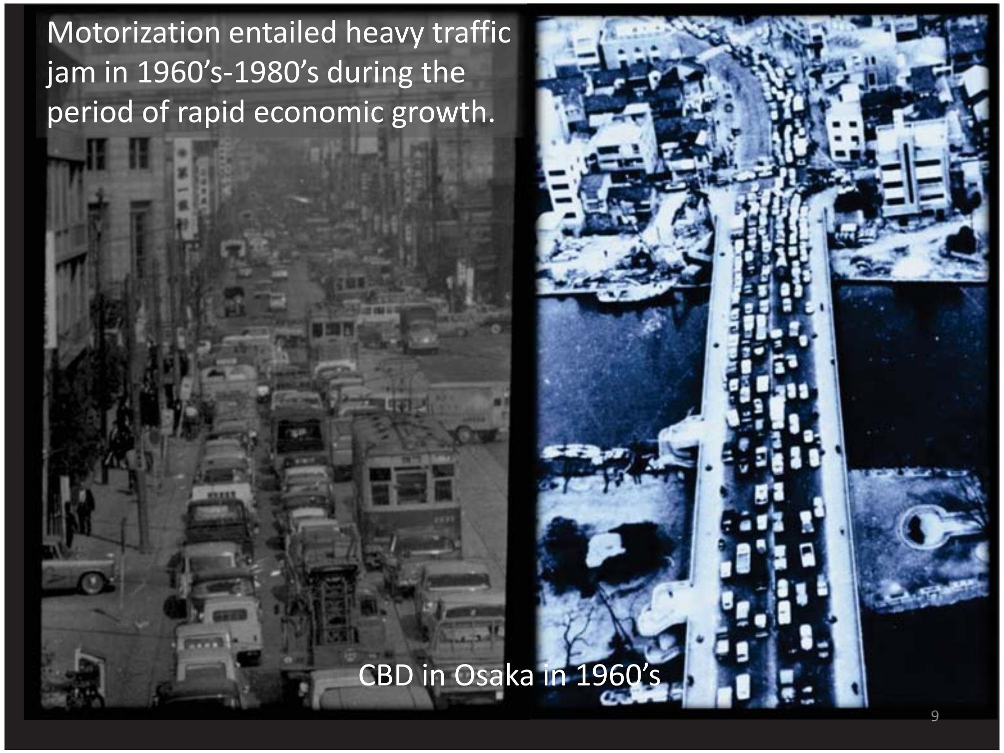
Privatization: 2005

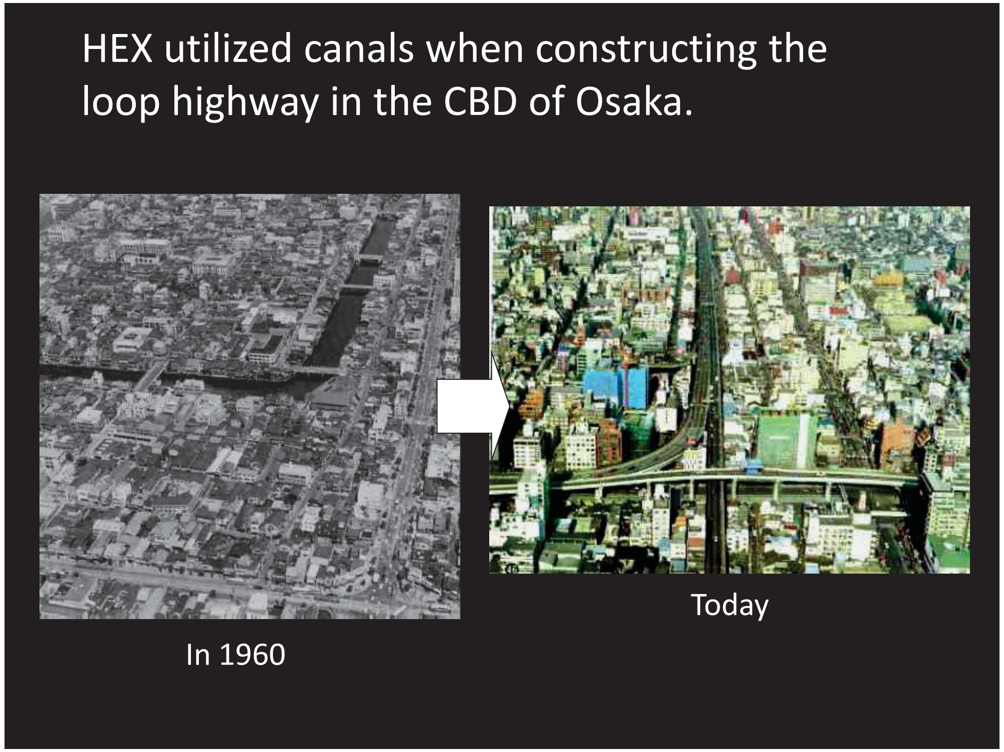
Equity Holders:
National Gov.
Local Gov. of the Kansai Metropolitan Region (Osaka, Hyogo & Kyoto)

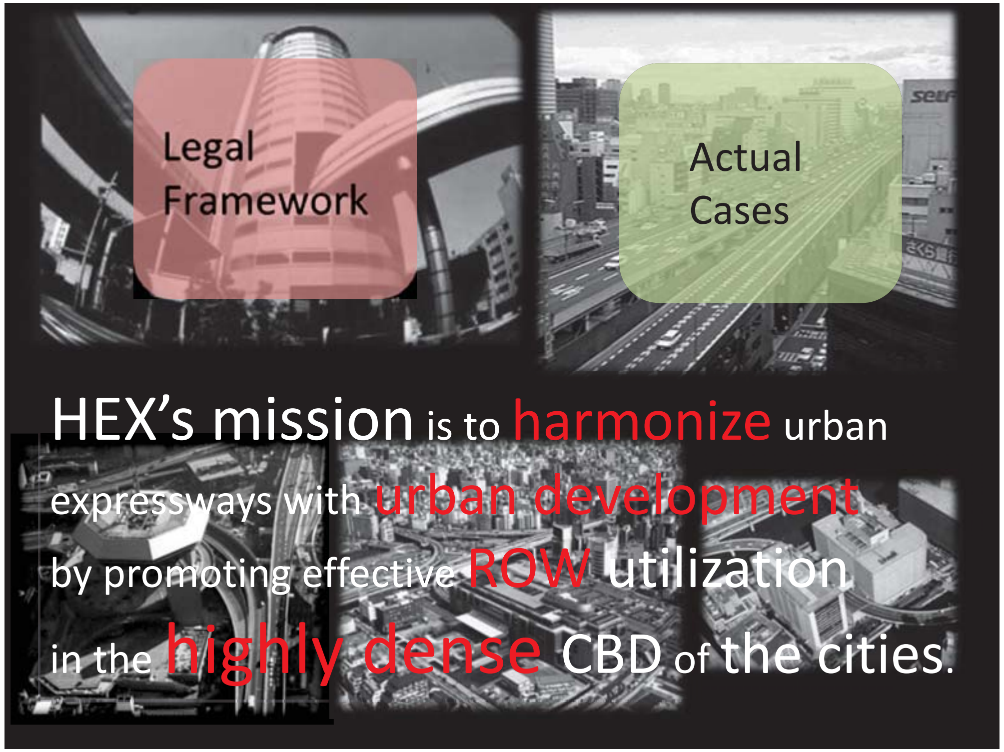
Capital: 20 billion JPY

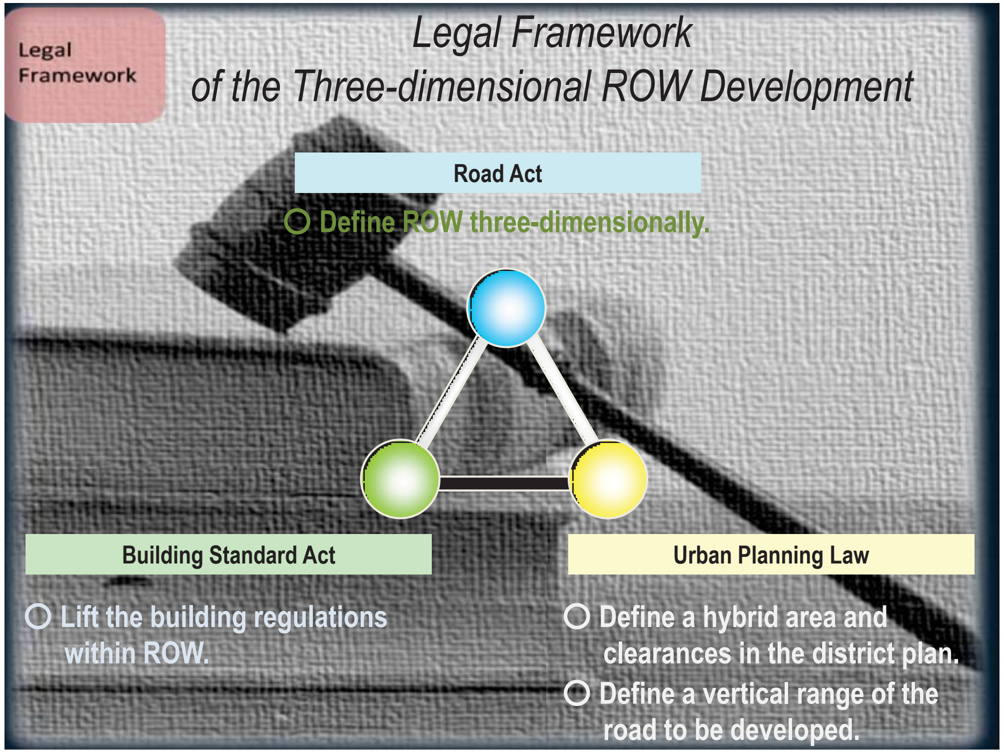
Annual Toll Revenue:
170 billion JPY (2013)

Operation & Maintenance: 259.1 km
Under Construction: 13.9km
Toll: 500-900JPY (Distance Basis)
Daily Traffic Amount: 700 thou.


Motorization entailed heavy traffic jam in 1960's-1980's during the period of rapid economic growth.
CBD in Osaka in 1960's
9

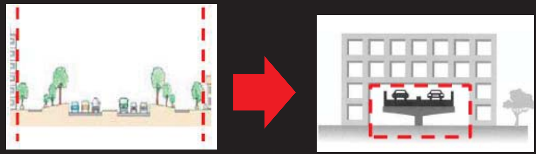

HEX utilized canals when constructing the loop highway in the CBD of Osaka.
In 1960
Today


Legal Framework
Actual Cases
HEX's mission is to harmonize urban expressways with urban development by promoting effective ROW utilization in the highly dense CBD of the cities.


Legal Framework
Legal Framework of the Three-dimensional ROW Development
Road Act
○ Define ROW three-dimensionally.
Building Standard Act
○ Lift the building regulations within ROW.
Urban Planning Law
○ Define a hybrid area and clearances in the district plan.
○ Define a vertical range of the road to be developed.

Legal Framework

In principle, any development is prohibited above/beneath roads.



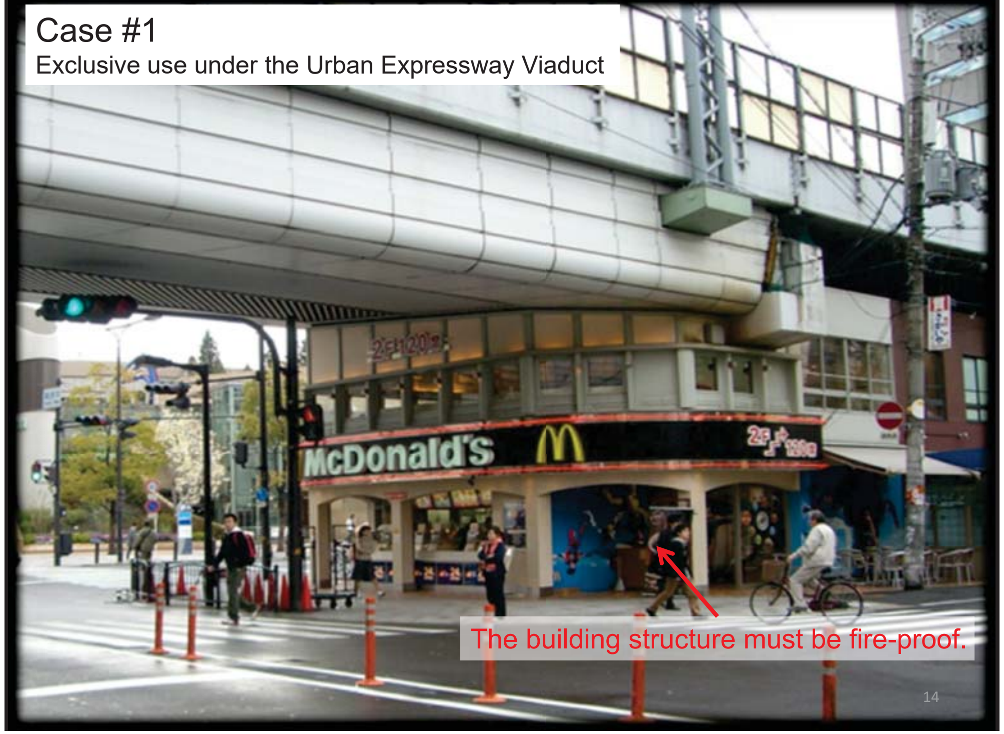
(Road Act)

However, Three-Dimensional ROW (3-D ROW) for the hybrid land use development is allowed to promote

urban space reallocation

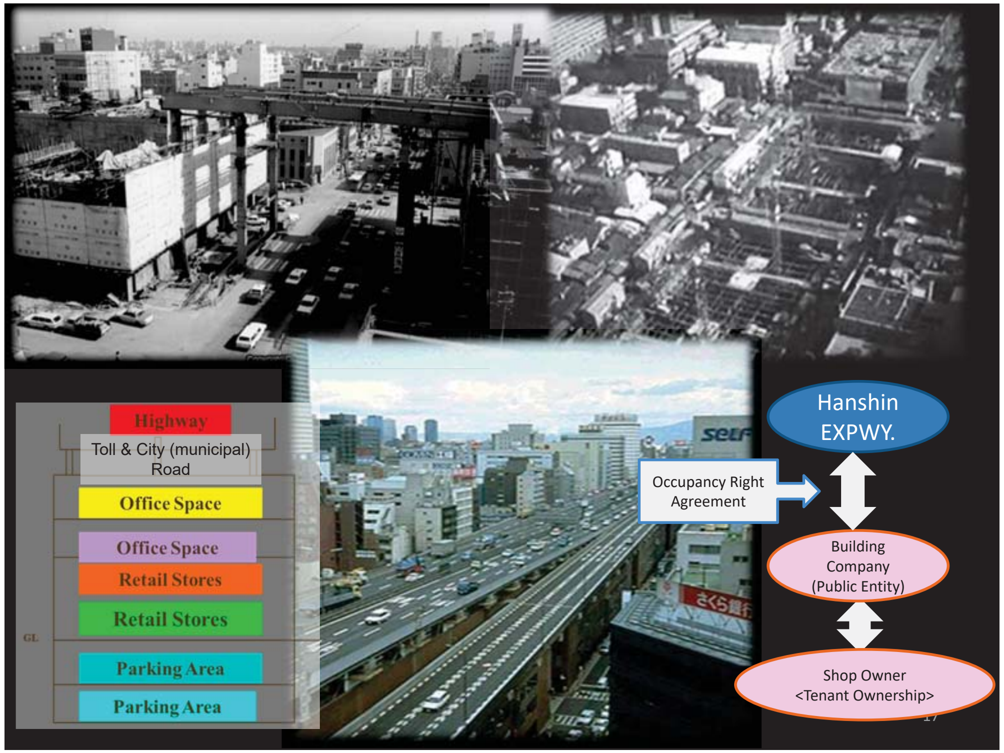
between PAPs and Gov.

Case #1
Exclusive use under the Urban Expressway Viaduct



Case #2
PAPs Livelihood Restoration under the Urban Expressway Viaduct

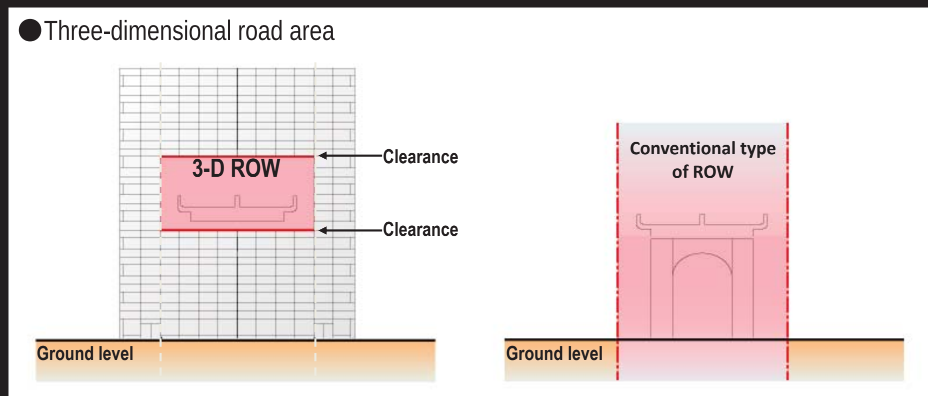
Case #3
Multi-level Road Development
@Senba Center Building
-Hybrid Land Use-



Road Act

Key point

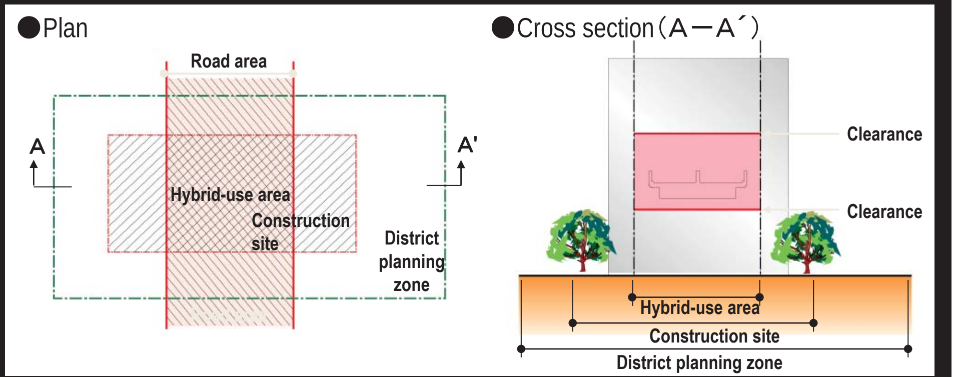
Define ROW three-dimensionally.
(Define upper and lower limits in space or underground.)



Urban Planning Law

Key point

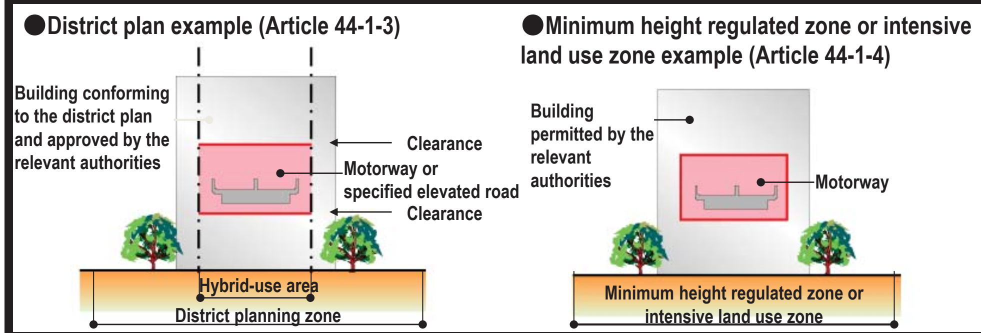
Define a hybrid-use area and clearances in the district plan.



Building Standard Act

Key point

Lift the building regulations within ROW.



Note: The building must be fire-proof in its primary frame and must be approved or permitted by the relevant authorities.

Case #5

Minatomachi River Place

-Promotion for TOD-

Minatomachi On/off Ramp (north) (Sakai Route #15)

Location: Naniwa-ku, Osaka City

Opened for service: April, 2002

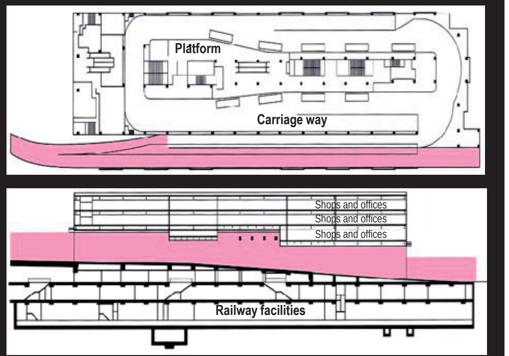
Features: Integrated road and building, height regulated zone

Minatomachi Off Ramp (south) (Sakai Route #15)

Location: Naniwa-ku, Osaka City

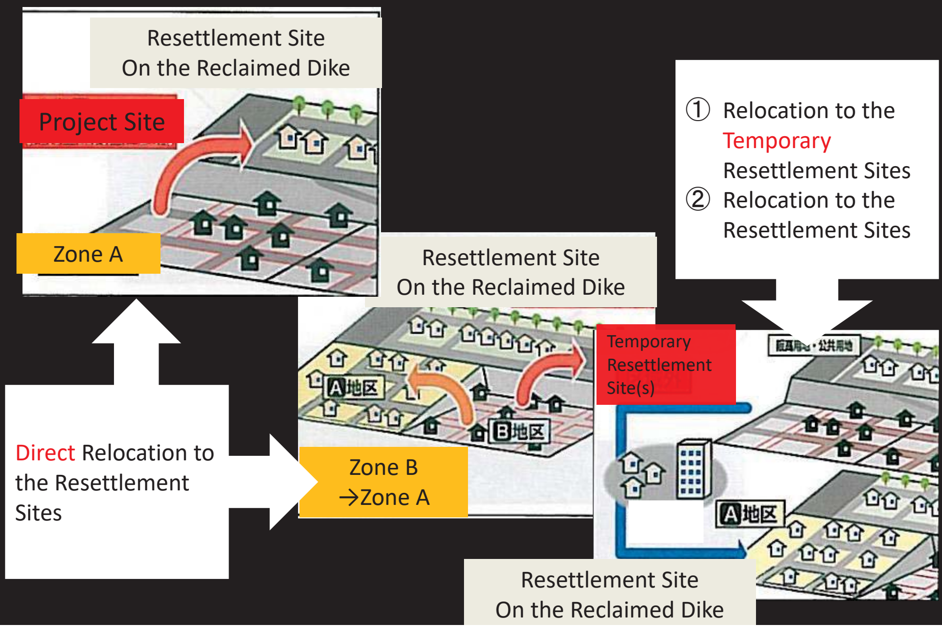
Opened for service: March, 1996

Features: Integrated road and building, redevelopment district plan (integrated into district plans by modification to the law)



Case #6
Yamatogawa Riverside Redevelopment Project

Land Readjustment of the Yamatogawa Riverside Redevelopment Project



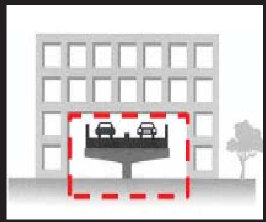
Challenging Issues

- Difficulty in Consensus Building due to the Complexity of the Project Scheme
- Longer Project Periods to convert a PAPs land title to other sorts of right (e.g., tenure) with just and fair compensation
- Encroachment and Regulations into/for the Private Property Area after completion of the structures for the maintenance reason

Conclusion

3-D ROW Development enables hybrid land use
by reallocating urban space
between the local community and government

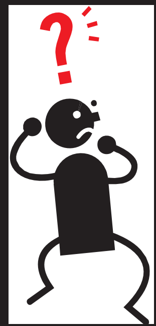
- To promote urban infrastructure development
- To restore livelihood of PAPs within the project site.



Development/amendment of the legal framework
(e.g., Land Law) should be prioritized
for the 3-D development.

Thank you!

ありがとうございました。



Please contact:
k.ogura.aa@jexway.jp

Second Speaker of <Session 3A>

Prof William H.K. Lam
Chair Professor and
Head Department of Civil and Environmental Engineering
The Hong Kong Polytechnic University
E-mail: william.lam@polyu.edu.hk (www.cee.polyu.edu.hk/~cehklam)

Brief Biography:

Prof William H.K. Lam is a Chair Professor of Civil and Transportation Engineering and Head of the Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Hong Kong. He is also an Honorary Professor at the Institute for Transport and Logistics Studies, The University of Sydney, Australia. He is the founding Editor-in-Chief of the SCI Journal – Transportmetrica and is now one of the Co-Editors-in-Chief of Transportmetrica A: Transport Science (http://www.tandf.co.uk/journals/ttra). Ir Prof. Lam is currently the Convenor of the International Advisory Committee of the International Symposium of Transportation and Traffic Theory (ISTTT) (www.isttt.org) and the President of the Hong Kong Society for Transportation Studies (HKSTS) (http://www.hksts.org). He is the past Chairman of Logistics and Transportation Division of the Hong Kong Institution of Engineers (HKIE) in 2014/15 and the past Chairman of Civil Division of the HKIE in 2002/03. Ir Prof. William H.K. Lam has over 35-year professional experience in research and practice for planning and design of transport infrastructures. He is the author of more than 200 SCI journal papers together with 70 consultancy reports. His research interests include transport network modeling and infrastructure planning, travel demand forecasts and risk assessment, ITS technology and planning, public transport and pedestrian studies.

Research & Development for Smart Mobility in Hong Kong
By Prof.Dr William H.K. Lam

Summary:

Reliable real-time traffic information is essential for road users to travel smart in congested road networks with stochastic travel time variations. In this presentation, an overview of recent development of intelligent transportation systems (ITS) in Hong Kong will be given together with further extensions. It will cover the development of ITS for the provision of real-time road traffic information using limited available data from multiple sensor systems (on-line data) in combination with historical data (off-line data) and a reliability-based path-finding (RPF) system. The RPF system could recommend the most reliable path at a specified on-time arrival probability based on the preferred departure or arrival time given by the user. Future research on smart city and smart mobility will also be discussed.

Acknowledgements:

The work was partially supported by grants from the Research Committee of The Hong Kong Polytechnic University (Project Nos. 1-BBA8 and 4-ZZFY).

Research & Development for Smart Mobility in Hong Kong

Ir Prof. William H.K. Lam

Chair Professor of Civil & Transportation Engineering and Head

Department of Civil & Environmental Engineering

The Hong Kong Polytechnic University

E-mail: william.lam@polyu.edu.hk

Website: www.cee.polyu.edu.hk/~cehklam

Department of Civil & Environmental Engineering

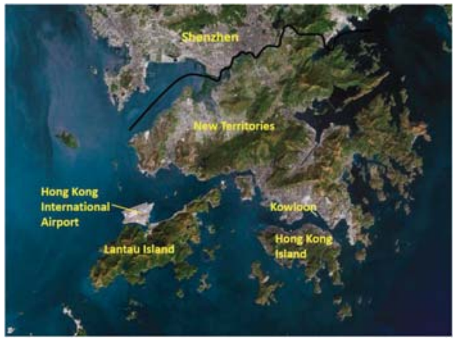
The Hong Kong Polytechnic University

Outline of the Presentation

1. Background and Hong Kong Statistics
2. Our ITS Projects for Hong Kong Government
3. Reliability-based Path Finding (RPF) System
4. Our R&D for Smart Mobility

Hong Kong Statistics

- Population: Over 7.37 million
- Total area：1,105 km^2 (24% land developed)
- Population density:
  - 6,600 persons/km^2 (Total land average)
  - **27,700 persons/km^2 (Developed land average)** Taipei: 9,950; Tokyo: 6,220; Bangkok: 5,300
  - 55,000 persons/km^2 (Highest district)
- **Road length = 2,100 km**
- **No. of licensed vehicles = 755,300** (as at May 2017)
- **185,800 commercial vehicles out of 755,300 licensed vehicles in Hong Kong in May 2017**

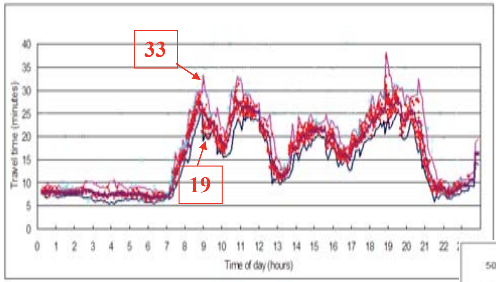


Within-day & Day-to-day Recurrent and Non-Recurrent Congestion Problems

- There are **with-in day and day-to-day recurrent and non-recurrent traffic congestion problems** in densely populated cities such as Hong Kong. It has considerable impact on economic productivity, environment and safety.

- However, due to the topography of Hong Kong, there are hardly any feasible sites for further expansion of existing road network. To alleviate the **recurrent and non-recurrent traffic congestion problems** in Hong Kong, recent attention has been given to develop intelligent transportation systems (ITS).

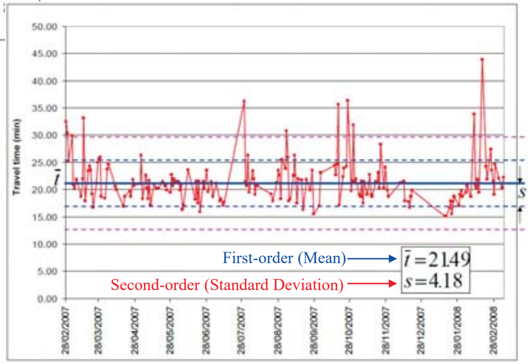
Traffic Dynamics – Stochastic Effects due to Uncertainties



Within-day travel time variations

Within-day
vs.
Day-to-day Dynamics

The first-order (Mean) and **second-order (Standard Deviation)** statistical properties of the traffic data should be considered for capturing the stochastic effects over time.



Day-to-day travel time variations

Non-recurrent and Recurrent Conditions

Supply Uncertainty		Demand Uncertainty
Adverse weather conditions, road works etc. (predictable)	Traffic accidents, vehicle breakdown etc. (less predictable)	Travel demand fluctuations (differ between weekday and weekend)

Non-recurrent conditions

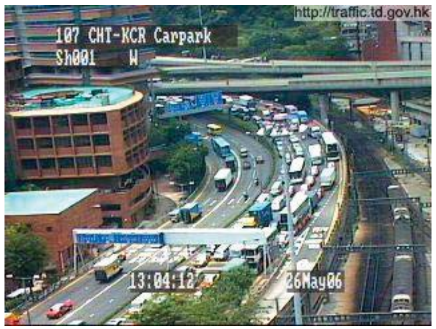
Recurrent conditions

11:20 am 19 Nov 2008 (Wed)

8:04 am 24 Feb 2006 (Fri)

8:04 am 25 Feb 2006 (Sat)

Network Uncertainty under Adverse Weather (Non-recurrent conditions)



1:04pm 26 May 2006 (Fri, no rain)

1:04pm 29 May 2006 (Mon, raining)

Adverse weather in Hong Kong: Three levels of warning signals by the levels of rainfall expected:- **AMBER** rainstorm signal (>30 mm/hour), **RED** rainstorm signal (>50 mm/hour) and **BLACK** rainstorm signal (>70 mm/hour).

Better Use of New Technologies

Objective

" The use of new technologies will be encouraged to increase the efficiency of traffic management, improve the overall capacity of the road system, and enhance road safety ."

Video on Intelligent Transportation Systems (ITS) in Hong Kong

http://www.polyu.edu.hk/openingminds/en/story.php?sid=17

Our ITS Projects for Hong Kong Government

Speed Map Panels (SMP)

Journey Time Indication System (JTIS)

Hong Kong eRouting
(http://hkerouting.gov.hk/drss/index.php?lang=EN)

Traffic Speed Map
(http://tis.td.gov.hk/rtis/ttis/index/main_partial.jsp)

Real-time Traffic Data Collection Technologies adopted in Hong Kong

Radio Frequency Identification (RFID) Reader

Automatic License Plate Recognition (ALPR) Detector

There is a need to make use of all different types of detector data!!!

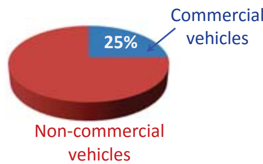
Loop Detector

Video Detector

Challenges of ITS Development in Hong Kong

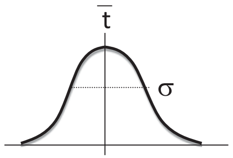
- Different types of traffic detectors
  - → Different types of data and sample sizes
- High installation cost
  - → Limited number of traffic detectors
  - → Large spacing between detectors
- Privacy issues
  - → Only commercial vehicle data can be used
  - → Limited sample sizes

185,800 commercial vehicles out of 755,300 licensed vehicles in Hong Kong as at May 2017



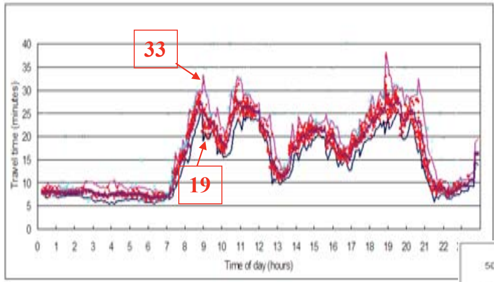
Limitation of the Existing ITS

The existing ITS in Hong Kong mainly provide average journey times or traffic speeds to the road users.



Second-order statistical properties (e.g. travel time variations) have NOT been considered.

Traffic Dynamics – Stochastic Effects due to Uncertainties



Within-day travel time variations

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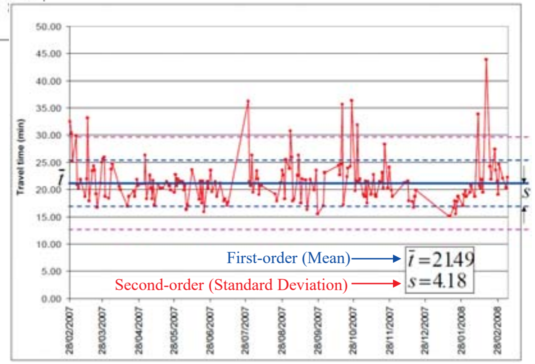
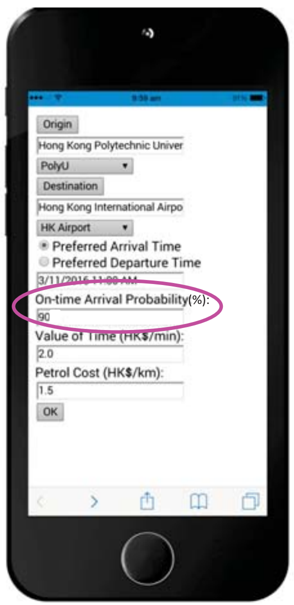
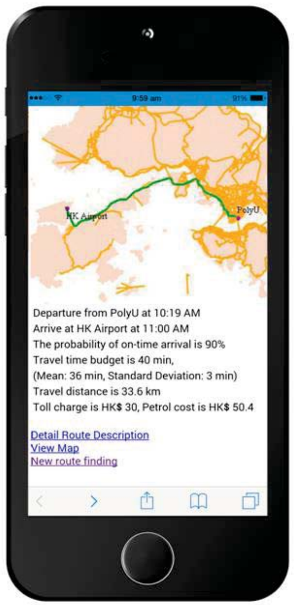


Day-to-day travel time variations

Prototype on Reliability-based Path Finding (RPF) System





A New Concept of Travel Time Reliability (On-time arrival probability) is introduced, in which the first-order and second-order statistical properties of the traffic data are considered.

Comparisons between PolyU Advanced Intelligent Transportation System and Google's

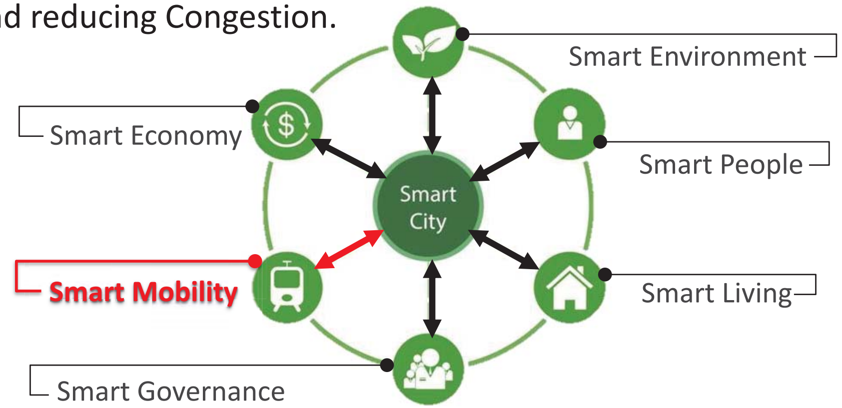
	Source of Data	Sample Size	Results	Validation
PolyU	Fixed detectors (Active)	Stable	Average journey time, travel time reliability, on-time arrival probability, personalized reliable driving route	Yes
Google	Mainly users' mobile phones (Passive)	Unstable, dependent on the number of users and their selected routes	Average journey time, the fastest route	No information

Our R&D for Smart Mobility

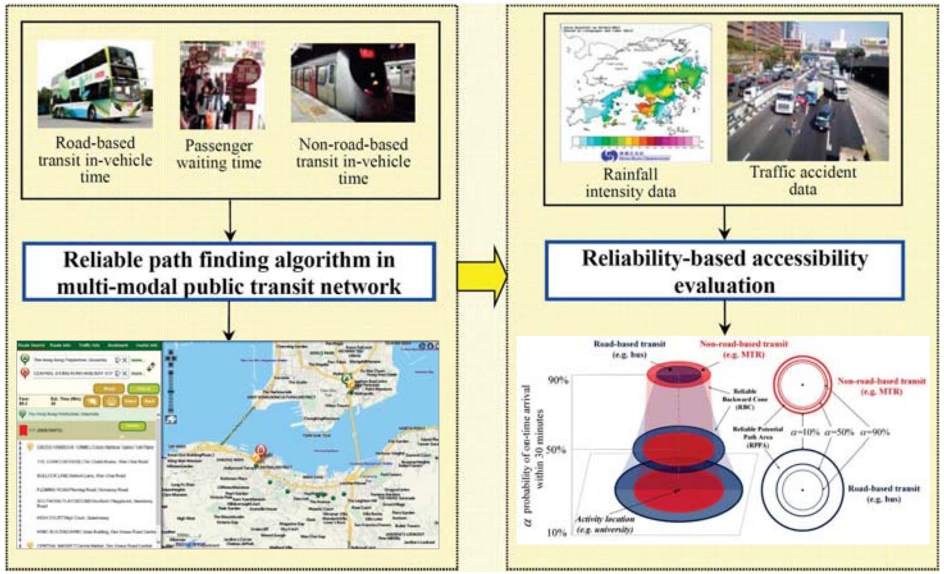
- Existing **Intelligent Transportation Systems (ITS)** are generally confined to <u>vehicles on the roads</u>.
- The reliability-based path finding system is developed mainly for <u>road users</u>.
- It is required to develop a door-to-door route guidance system in the multi-modal transportation networks.

Our R&D for Smart Mobility

- Network connectivity and walkability issues for both motorized and active modes (particularly the walking mode) have become critically important in Hong Kong densely populated areas.
- Development of Walkable Smart City for improving Health and reducing Congestion.



Reliability-based Accessibility Studies



Multi-Modal Door-to-Door Route Guidance System

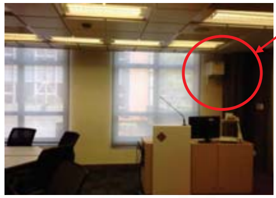
- Collaborated with Beijing University of Technology, China.
- To provide a **door-to-door low-carbon route guidance service** to travelers in the multi-modal transportation networks in Hong Kong and Beijing.

Metro Station in Beijing

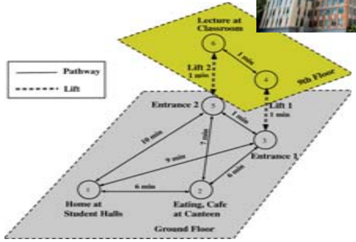
Bus Stop in Hong Kong

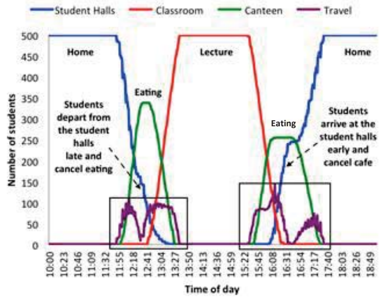
Activity-Travel Behavior Analysis

- To develop and calibrate activity-based travel demand models using re-identified MAC addresses from mobile devices.



Wi-Fi scanner for capturing MAC addresses





Temporal distribution of students at activity locations

Smart Campus Development

- Facility planning and operational management
  - Examples: classrooms, canteen and elevator

Wi-Fi scanner for capturing MAC addresses

14:00	
13:00	bottle neck
12:00	
11:00	
10:00	
9:00	bottle neck
8:00	
7:00	

Level of service

ACKNOWLEDGEMENTS
This work was partially supported by grants from the Research Committee of PolyU (Project Nos. 1-BBA8 and 4-ZZFY).

Thank You!

william.lam@polyu.edu.hk (*Ir Prof. William H.K. Lam*)

http://www.cee.polyu.edu.hk/~cehklam/

The 22nd HKSTS International Conference
9-11 December 2017, Hong Kong
http://www.hksts.org

THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING 土木及環境工程學系

Third Speaker of <Session 3A>

Mr. Hirouki MIZUI
Project Manager of JICA Study Team
Preparatory Survey on Bangkok-Chiang Mai High Speed Rail Development Project
Japan International Consultants for Transportation
E-mail:

Brief Biography:

Professional Career
-Nagano Depot, Hokuriku-Shinkansen
-Taiwan High Speed Railway
-Project Manager of Track Work for Dubai Metro Red and Green Line
-Construction Department of East Japan Railway Company
-Deputy Project Manager of Feasibility Study for Jakarta – Bandung High Speed Railway Project, Phase 1, Stage 2
-Project Manager of Preparatory Survey on Bangkok – Chiang Mai High Speed Rail Development Project, Phase 1

Education:

1988-1992:	*Bachelor of Technology,*	*Kyusyu University*
1992-1994:	*Master of Technology,*	*Kyusyu University*

Qualification:
-Professional Engineer (Civil Engineering)
-Qualified Surveyor
-The First-Class Civil Engineering Works Execution Managing Engineer etc.

Transport Infrastructure and Regional Development for Smart Mobility from the HSR Experience of Japan

By Mr. Hirouki MIZUI

Summary:

A. Outline of Bangkok – Phitsanulok as a part of Bangkok – Chiang Mai High Speed Rail
- *Overall View and Station Location*
- *Travel Time from Bangkok to Phitsanulok*
- *JICA Study Schedule*

B. Japan's Philosophy and Concept for Bangkok – Phitsanulok High Speed Rail
- *Route Alignment and Infrastructures*
- *Japan's Philosophy: Overall Optimum and Technology Transfer*
- *Advantage of Japan's High Speed Rail*

C. Japan's Philosophy on High Speed Rail Project Scheme
- *Japan's PPP Scheme*
- *HSR operator shouldn't bear heavy burden of capital investment*
- *HSR operator should be able to focus on safe and stable operation*

D. Integration of High Speed Rail and Regional Development
- *Creation of High Speed Rail Demand*
- *Public Sector should lead the Development on the Axis of Public Transportation*
- *Case Report in Japan*

Fourth Speaker of <Session 3A>

Prof.Dr. Atsushi Fukuda
Professor of Department of Transportation Systems Engineering,
College of Science and Technology,Nihon University
E-mail:fukuda.atsushi@nihon-u.ac.jp

Brief Biography:

Professor Atsushi FUKUDA has served in the academic field for 26 years teaching and doing research in the field of transportation systems analysis and transportation planning. He was seconded by the Japan International Cooperation Agency (JICA) as Assistant Professor to the Asian Institute of Technology for two years. He has also fulfilled his responsibility as Chairperson of the Advisory Committee for many ODA projects such as the study on improvement of road traffic environment in Chiang Mai City, Thailand.

Prof. Fukuda has led various feasibility studies on the Clean Development Mechanism, Nationally Appropriate Mitigation Actions (NAMAs) and Joint Crediting Mechanism (JCM) studies in the transport sector in the ASEAN region.

Education:

1978-1982:	*B.Eng. (Transportation Engineering) Nihon University*
1982-1984:	*M.Eng. (Transportation Engineering) Nihon University*
1984-1988:	*Dr.Eng, (Transportation Engineering) Nihon University*

Honors and Awards:

1988	*IATSS Dissertation Award, IATSS*
1997	*Best Presenter Award, 52th Annual Meeting of JSCE*
2003	*Best Paper in the Decision Technologies Track Award, 36th Annual Hawaii International Conference in System Sciences*
2006	*Excellent Practice Paper Award, the 3rd National Transport Conference, Ministry of Transport, Engineering Institute of Thailand, Khonkean University*
2009	*International Activity Incentive Award, Japan Society of Civil Engineers (JSCE)*

Walkable Environment for Smart Mobility and Transit Oriented Development – TOD
By Prof.Dr. Atsushi Fukuda

Summary:

Along with the development of urban railway in Bangkok, many condominiums and offices in the city center and houses in the suburbs have been constructed near the railway station. It is looks like Transit Oriented Development (TOD). However, many of residents or employees who live or work at such places still drive their cars or use other mode. So that, walkable area which is fundamental concept of TOD have never been realized in Bangkok. Why people doesn't walk to access to a station? This is basic question in this presentation.

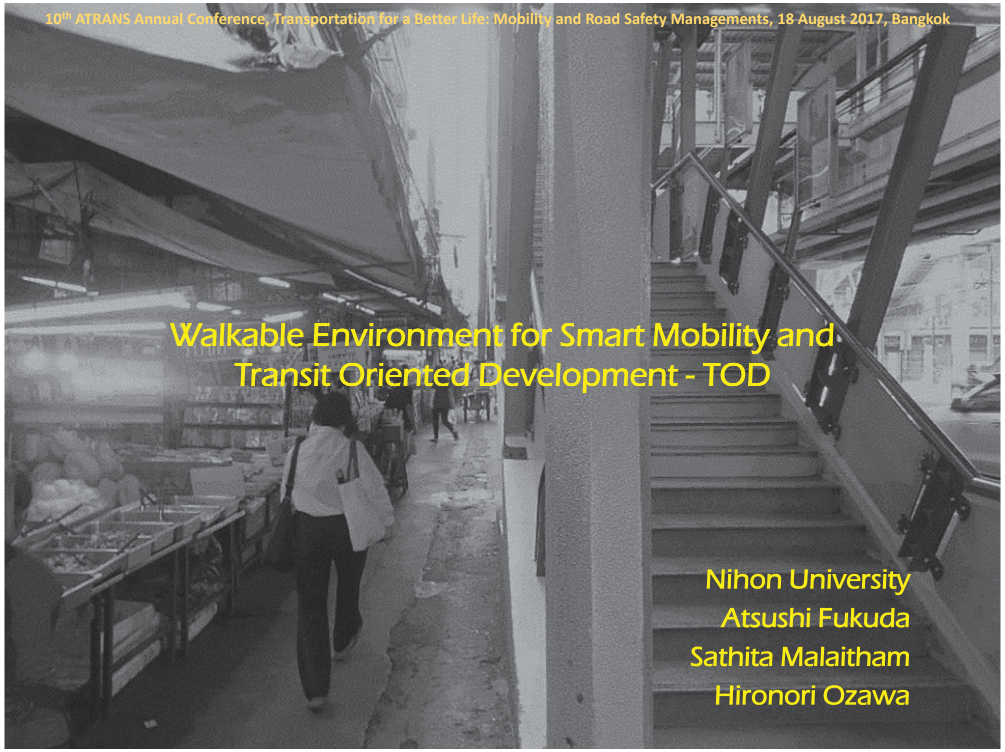
This presentation tried to revealed walking environment near the urban railway stations in Bangkok. First, the accessibility to the urban railway stations were analyzed. The area which can reach to the station within 5, 10 or 15 minutes on foot were estimated by using GIS. This result clearly shows the area can reach to the station are quite limited and distorted because of poor connectivity of streets near the railway station. As the result of simulation, it is confirmed the area will be expanded significantly by improving connectivity of streets.

Secondary, walkability near the urban railway stations was measured by applying proposed walkability index. As the result of comparison between 3 station in Bangkok and the station in Japan, it was concluded that walkability in Bangkok is very poor. There are many obstructions on footpath including damage on surface, gaps of sidewalk, illegal motorcycle parking and vender shops. This situation also can be improved by removing such obstructions.

Finally, possibility to provided good infrastructure near the urban railway station were also analyzed. Since vacant land even near the railway station which will be constructed near future such as Yellow line, Pink line and Orange line are quite limited, we recommended that improvement of urban area by applying the land readjustment project, urban renewal project, etc. should be carried out.

As conclusion, it is strongly recommended that the any procedure to evaluate accessibility and/or walkability near the urban railway station and propose improvement plan before the new railway will be constructed. Also, institutional cooperation between organizations concerning transportation planning and urban/city planning also be recommended.

10th ATRANS Annual Conference, Transportation for a Better Life: Mobility and Road Safety Managements, 18 August 2017, Bangkok



Walkable Environment for Smart Mobility and Transit Oriented Development - TOD

Nihon University
Atsushi Fukuda
Sathita Malaitham
Hironori Ozawa

Urban Rail Development and Urban Development in BKK

In the Bangkok metropolitan area, many condominiums have been developed with the development of urban railway based on M-MAP as a trigger.

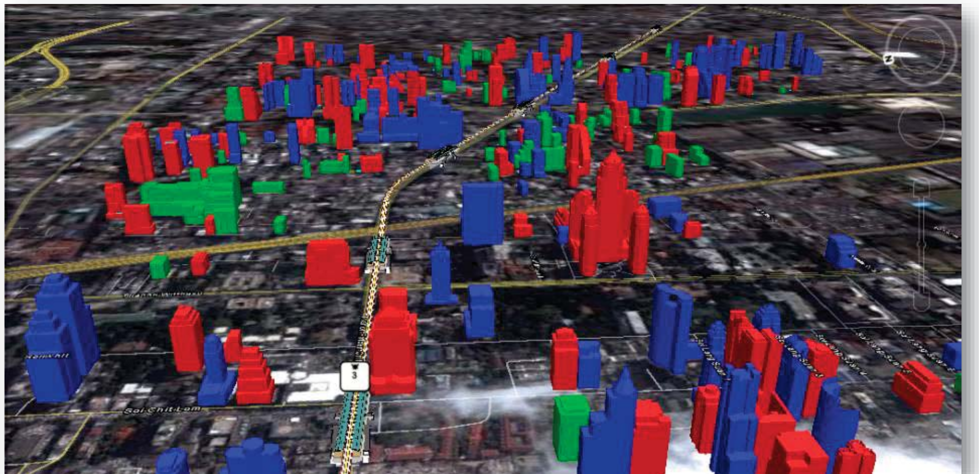
Definition of Transit Oriented Development

In urban planning, a transit-oriented development (TOD) is a type of urban development that maximizes the amount of residential, business and leisure space within walking distance of public transport. ... A TOD is also typically designed to be more walkable than other built-up areas, ...
The densest areas of a TOD are normally located within a radius of ¼ to ½ mile (400 to 800 m) around the central transit stop, as this is considered to be an appropriate scale for pedestrians, thus solving the last mile problem

Figure 6: Representative TOD zone
(Source: Calthorpe, 1993)

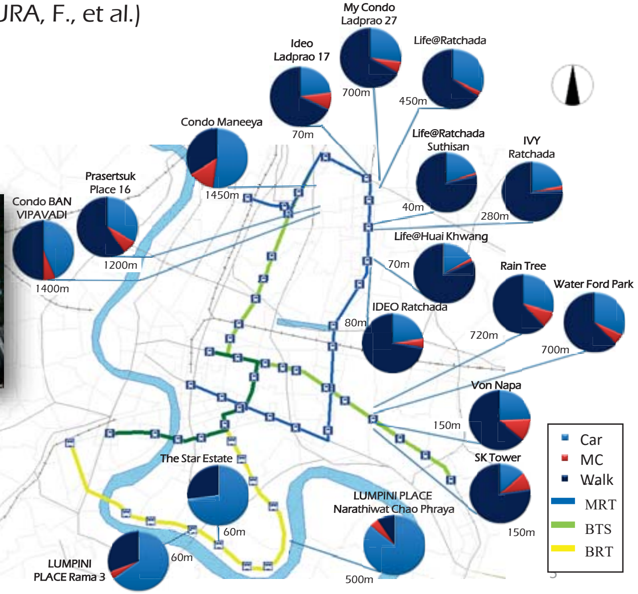
Urban Rail Development and Urban Development in BKK

Many condominiums and offices have been constructed after opening of BTS and MRT (by Dr. Varameth and Dr. Sathita).

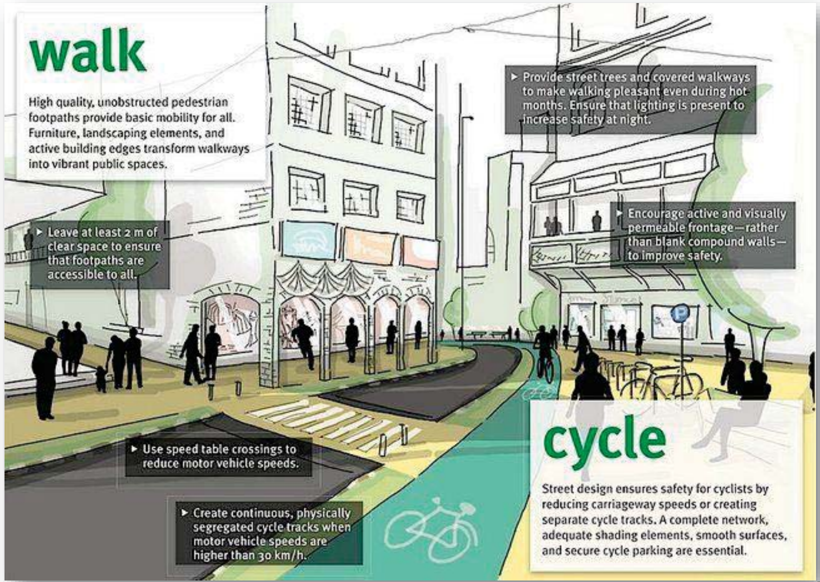


Access Modes to Railway Station in BKK

However, many of residents who live in condominium near the station still drive their car (by FUKUDA, A., NAKAMURA, F., et al.)



Definition of Transit Oriented Development



https://www.pinterest.com/bettyasaenz/transit-oriented-developments/

Urban Development along ARL

- Residential areas appear to be developed along railroads.
- High-rise condominiums and offices have been constructing in front of some stations

Urban Development along ARL

- In reality, residential areas have been developed according to construction of highway such as Bangkok-Chonburi Motorway, outer ring road etc.
- Therefore, access to the railway station is hardly considered.

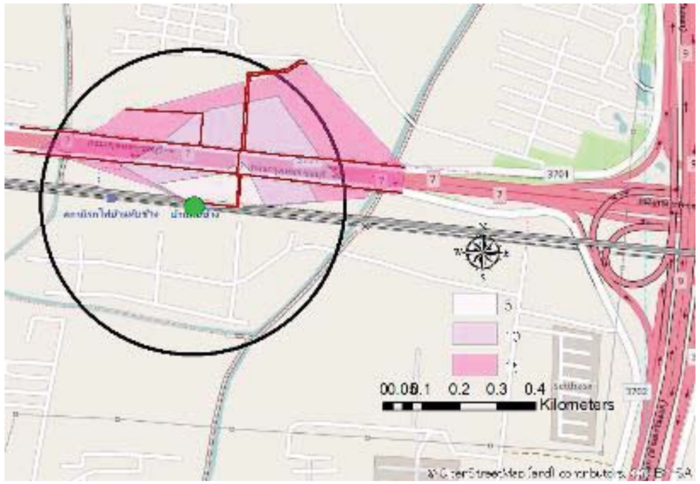
Access to ARL

Even in the development area in front of the station, the access route is not considered.

Access Modes to ARL

Analysis of Accessibility on foot in the case of ARL

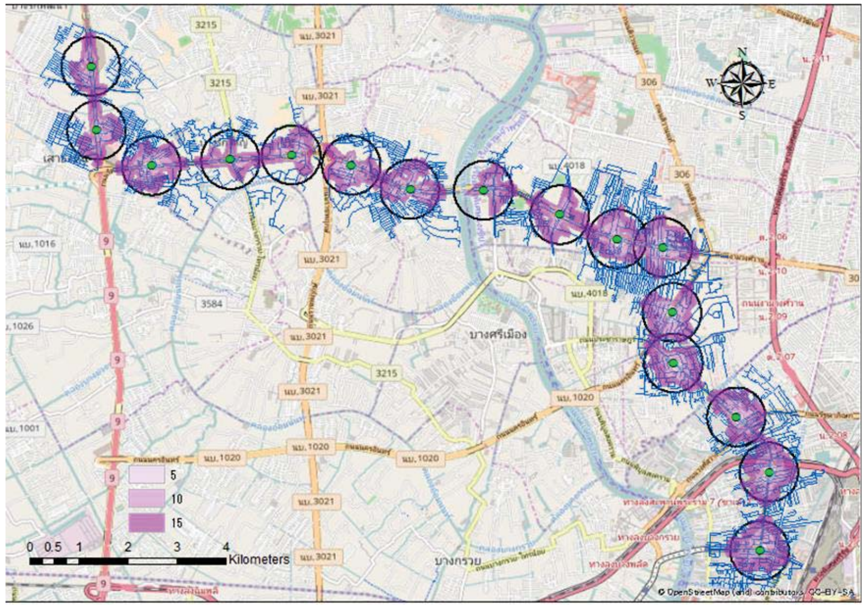
Accessibility to Ban Thap Chang Station of ARL



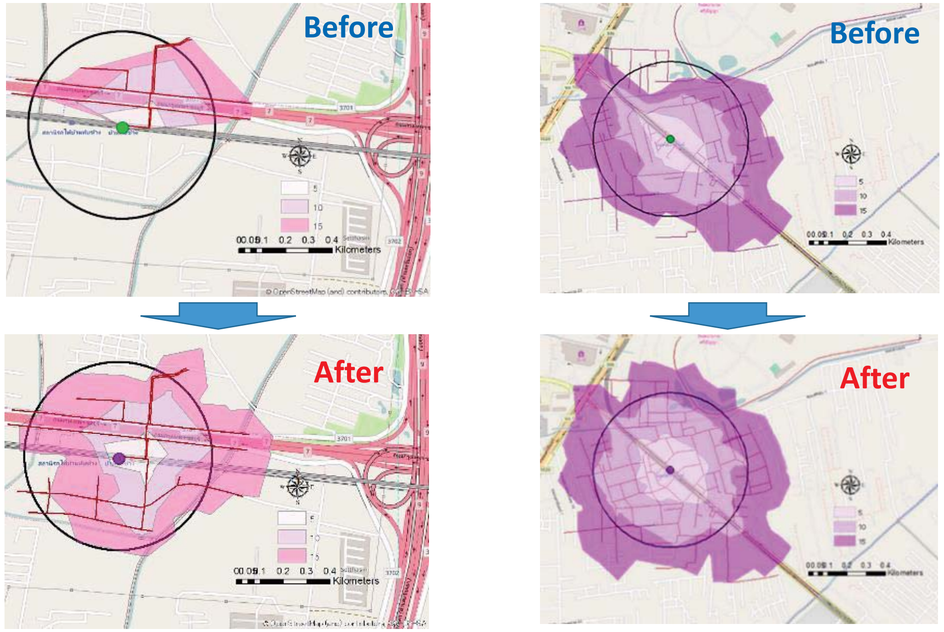
50 m/min. by walk, 20km/hr. by motorcycle
Black circle show the area with 400 m (1/4 mile) diameter.

Analysis of Accessibility on foot in the case of PL

Accessibility along PL

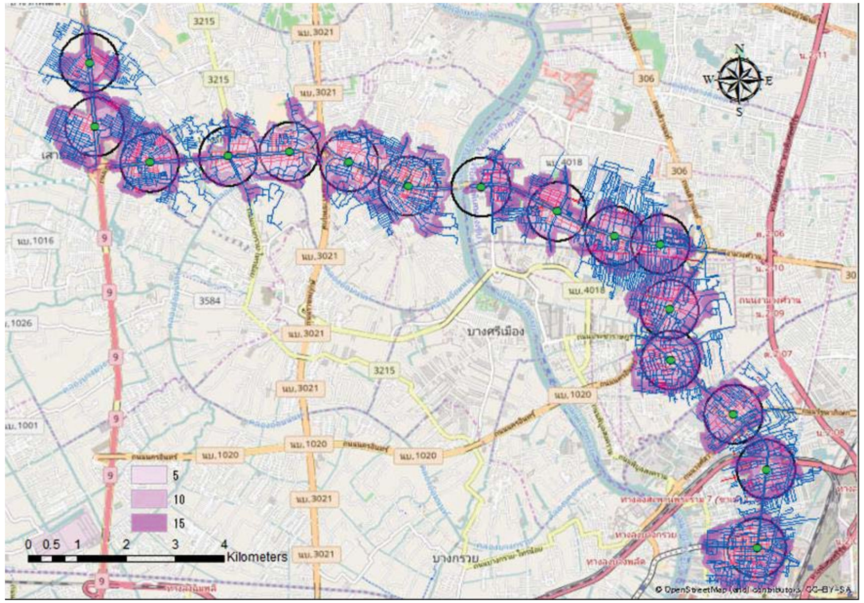


Impacts to improve road network on accessibility on foot



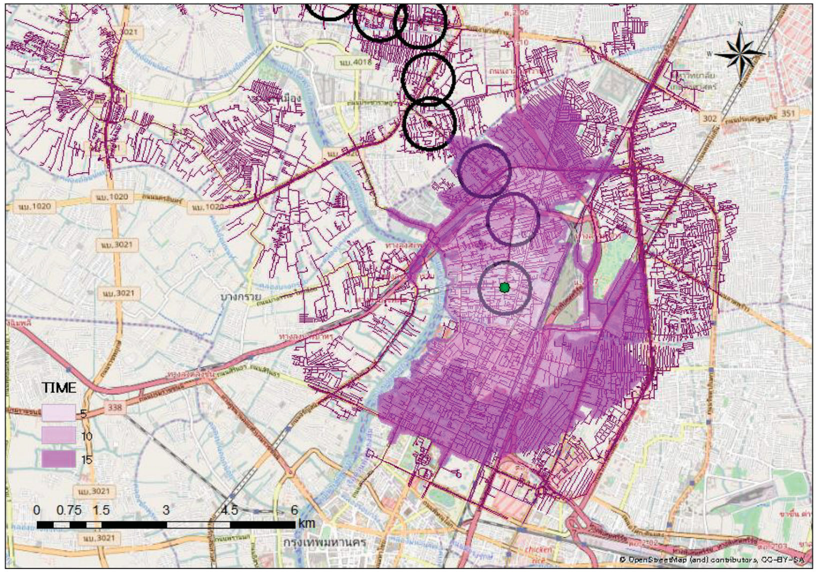
Impacts of road network improvement on accessibility on foot

Accessibility along PL after Improvement (Plan)



Impacts of road network improvement on accessibility by MC

Accessibility to Tao Poon Station of PL by a motorcycle.



Problems on Walking Environment in BKK

<Broken footpath>

<step on the sidewalk>

<Public facilities>

<Unpaved street>

<Drain port>

<Narrow sidewalks>

Study of walkability

＜BTS Sukhumvit Line Thong Lo St.＞

It is located in commercial area.

＜ARL Ban Thap Chang St.＞

・It is located in new residential area near airport

＜MRT Purple Line Yaek Tiwanon St.＞

It is located in residential area in northern Bangkok.

＜Keisei Railway Kozunomori St.＞

This is typical area in which Land readjustment project has been done.

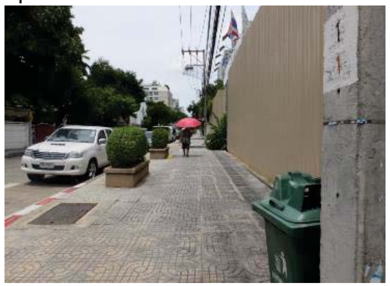
Example of Scores

＜Lv.1 Not separated Score: -2＞

＜Lv.2 Separated with white line Score: 0＞

＜Lv.3 Separated with fence Score: 2＞

＜Lv.4 Separated with sidewalk Score: 4＞



Measurement of Walkability Indexes for 3 stations in BKK

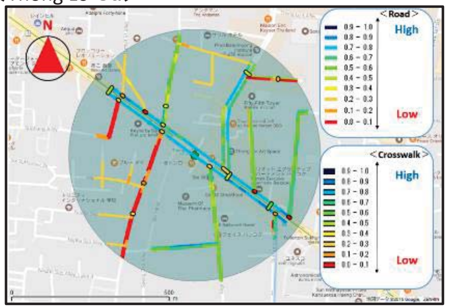
- Evaluation items for sidewalk/road, pedestrian bridge, crosswalk are set.
- They are divided into upper, middle, and lower levels.

Research Objects	Upper Items	Middle Items	Lower Items
Sidewalk/Road	Structure	Sidewalks, Steps, Width, Surface Condition	Number and Height of Steps, Pavement and Condition of Surface
	Environment	Obstacles, Cleanliness, Dangerou Spots	Permanent and Factitious Obstacles, Manholes, Electric Wires
	Equipment	Lights, Signs, Plantings, Street Furnitures	–
Pedestrian Bridge	Structure	Width, Equipment, Pavement, Stair Steps	Width of Stairs and Passanges
	Environment	Cleanliness, Obstacles	Cleanliness and Obstacles in Stairs and Passanges
Crosswalk	Crossing Structure	White Line, Pedestrian Traffic Signal, Structure	–
	Environment	Waiting Spaces, Obstacles	Permanent and Factitious Obstacles

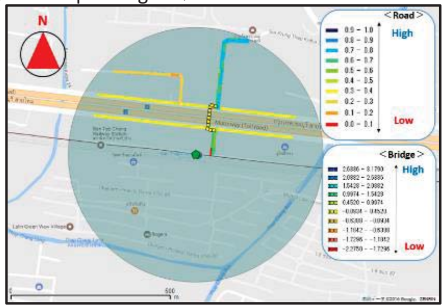
	A. Structure	B. Environment	C. Equipment	Geometric Means	Weight
A. Structure	1	2.649	5.743	1.915	0.549
B. Environment	0.378	1	4.211	1.095	0.314
C. Equipment	0.174	0.237	1	0.477	0.137
				3.487	1

Results of Measurement of Walkability

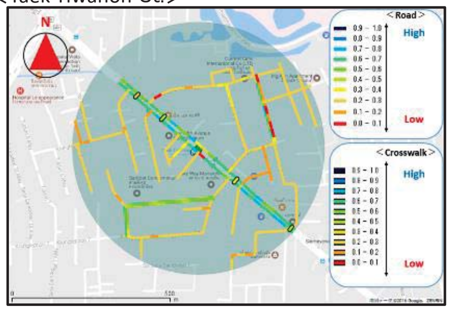
＜Thong Lo St.＞



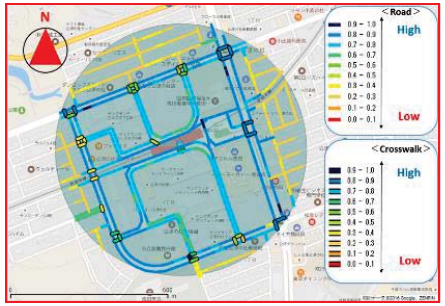
＜Ban Thap Chang St.＞



＜Yaek Tiwanon St.＞



＜Kouzunomori St.＞



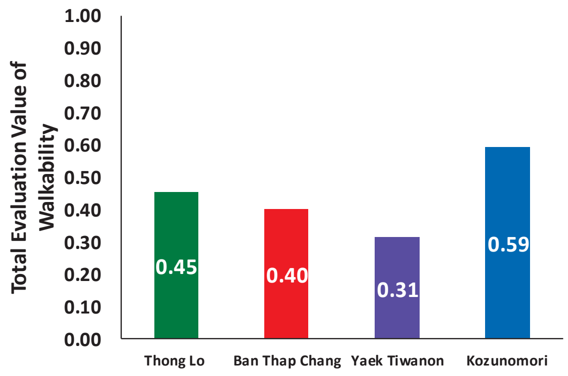
Results of Measurement of Walkability

Station	Comparison	Color-code	Evaluation Value
Kozunomori St.	Main Street	Light Blue - Blue	0.6 — 1.0
	Side Road	Orange - Light Blue	0.2 — 0.8
	Crosswalk	Orange - Blue	0.3 — 1.0
Three stations in Bangkok	Main Street	Red - Blue	0.1 — 0.9
	Side Road	Red - Light Blue	0.0 — 0.9
	Crosswalk	Red - Yellow Green	0.0 — 0.7

Sidewalk/Road :	MAX 1.0	MIN 0.0
Crosswalk :	MAX 1.0	MIN 0.0

There are some problems in the walking environment around stations in Bangkok

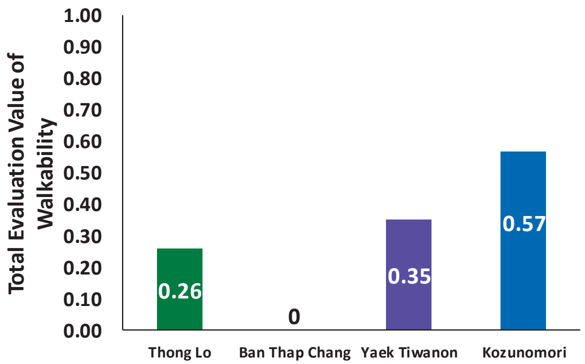
Comparison of Walkability (Sidewalk/Road)



・Obstacles such as stalls and street parking, sidewalk availability, width of roads and sidewalks influence on walkability to stations.

・In particular, the presence or absence of sidewalk was regarded as more important as a result of AHP, and exerted a large influence.

Comparison of Walkability (Crosswalk)



・As a result of the AHP questionnaire, it was found that installation of pedestrian traffic signal, the presence or absence of facilities considering pedestrians, and waiting spaces on sidewalks are thought to be important factors.

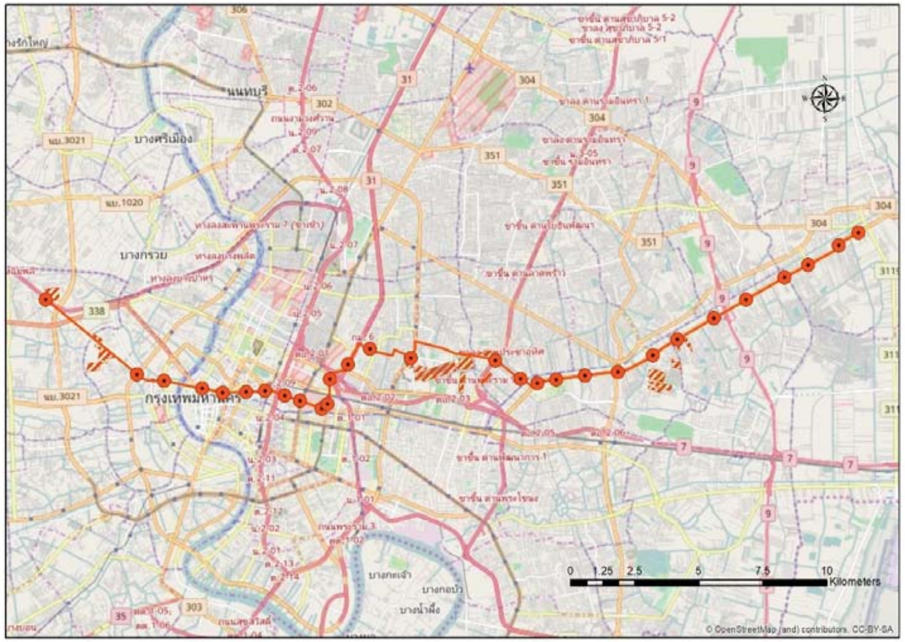
・The reason why the result of Thong Lo station is lower compared with Yaek Tiwanon station is the disappearance of the white line and the small amount of waiting space.

Idea of TOD by public sectors

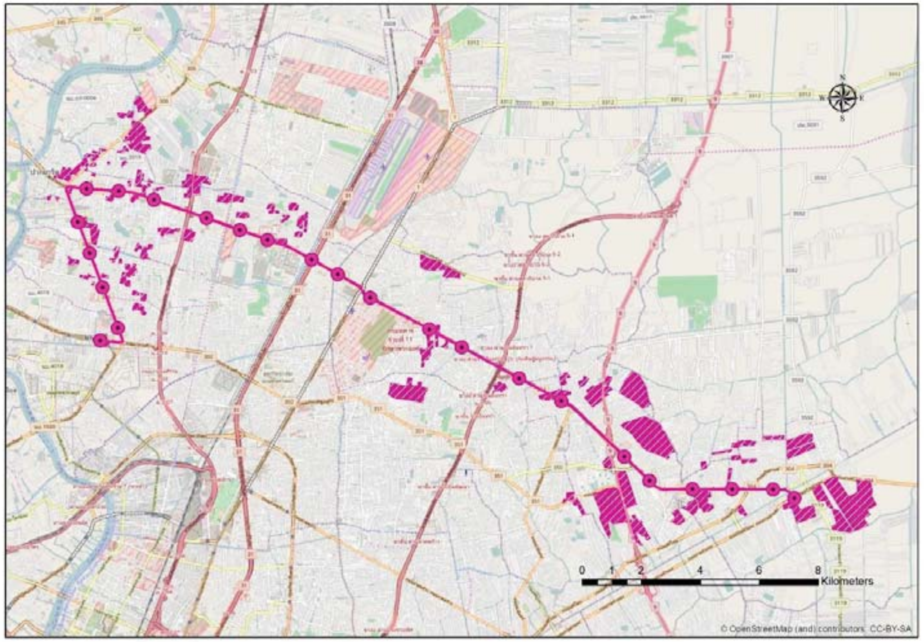
Condition 1: MRTA's subsidiary + NHA

Condition 2: NHA leases the MRTA's subsidiary - owned land

Availability of Development (Orange Line)



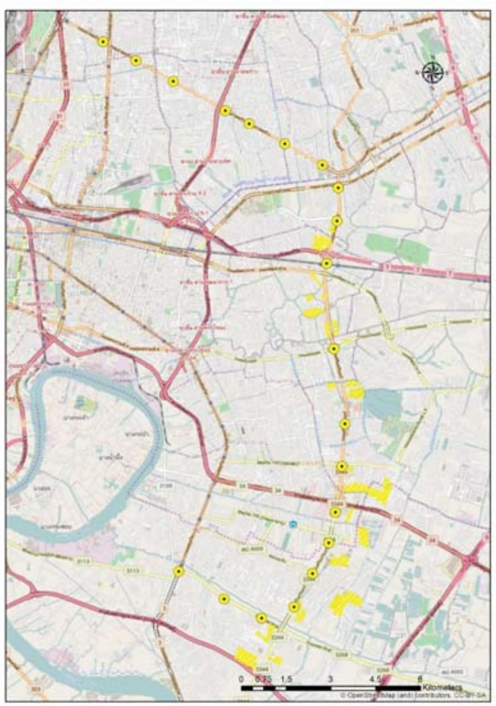
Availability of Development (Pink Line)



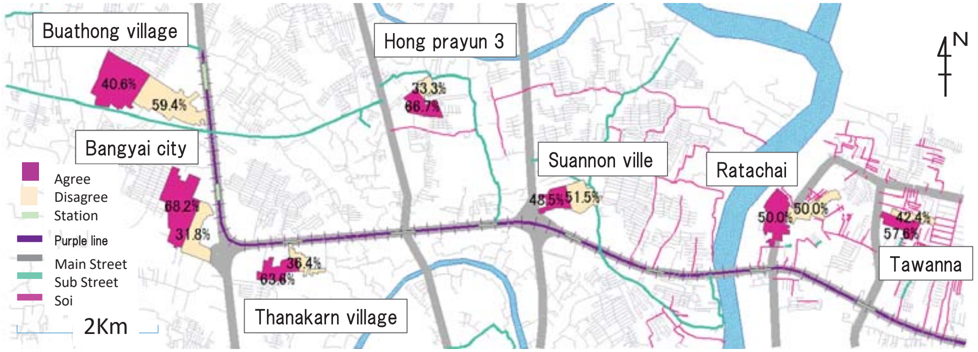
Availability of Development (Yellow Line)

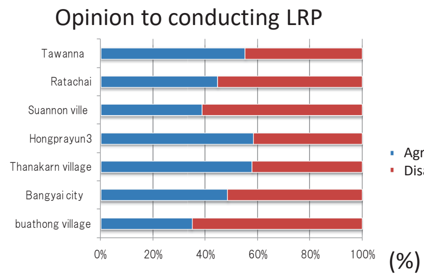
As the result of analysis, there are not much vacant to develop near urban railway or monorails.

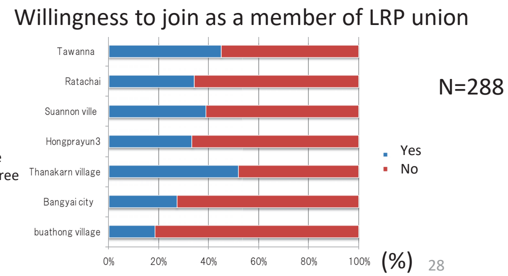
Thus, Existing Urbanized Areas near the railway stations should be reformed by applying the land readjustment project, urban renewal project, etc.



Acceptability for Land Readjustment Project along PL







Conclusions

Even many condominiums, offices and residential houses have been developed near urban railway station stations, there is no coordination with urban development so that existing condition of infrastructure, especially streets and open spaces are very poor in Bangkok.

Accessibility near the most of rail station is very low so that it is very hard to access to the railway station by walk.

Also, walkability is also very low. It is necessary to improve walkability near railway stations in Bangkok.

The area along planned new lines have been almost developed. Thus, land readjustment project, urban renewal project, etc. are quite necessary to apply to improve infrastructure level and accessibility/walkability.

It is strongly recommended to conduct pre-evaluation of accessibility/walkability near the railway station before constructing new railway system. And, improvement of infrastructure should be carried out.

Fifth Speaker of <Session 3A>

Dr.Sumet Ongkittikul
Thailand Development Research Institute (TDRI) Foundation, Thailand
E-mail: sumet@tdri.or.th

Brief Biography:

Dr.Sumet Ongkittikul is a research director for transportation and logistics policy at the Thailand Development Research Institute. He holds a PhD in Social Sciences (Transport Studies) from Erasmus University Rotterdam. His main research interests are in the fields of transport policy, transport regulation, logistics, and road safety. His current research includes transport and trade facilitation in ASEAN; financing transport infrastructure; urban bus regulatory reform; public transport safety; and road safety policy.

Ride – Sharing for Smart Mobility
By Dr.Sumet Ongkittikul

Summary:

สถาบันวิจัยเพื่อการพัฒนาประเทศไทย

TDRI
http://tdri.or.th

Ride-sharing Application

Sumet Ongkittikul

TDRI

Content

- Sharing Economy
- Taxi Industry
- Effect of Sharing Economy: Case of UBER
- Ride-Sharing App in Thailand

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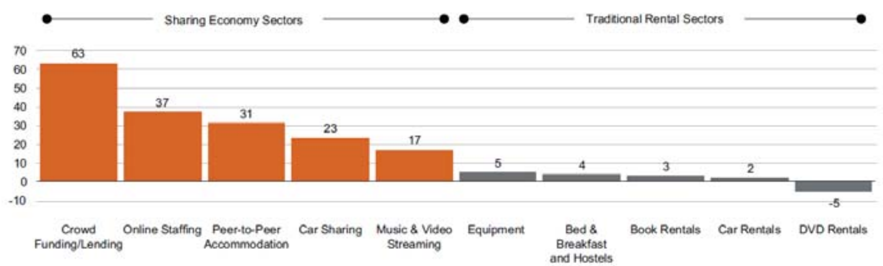
Sharing Economy

Projected Compound Annual Growth Rate for Key Sharing Economy Sectors
(In % 2013-2025)



MANY SHARING ECONOMY SECTORS— INCLUDING CAR AND HOUSE RENTAL-- WILL GROW MUCH FASTER THAN TRADITIONAL RENTAL SECTORS

Source: http://thinkers50.com/wp-content/uploads/The-Rise-of-the-Sharing-Economy.pdf

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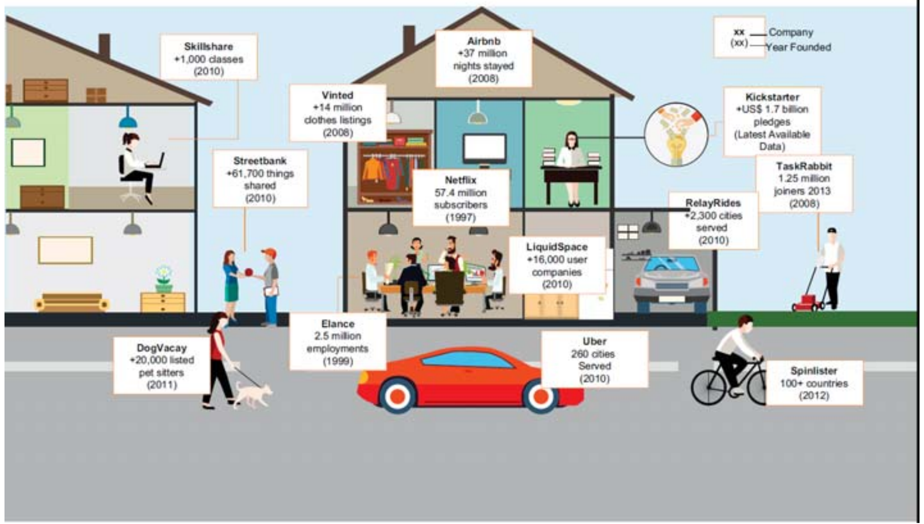
Sharing Economy

Leading Sharing Economy Enterprises Impacting Traditional Business
(2014 or Latest Available Data)



Source: http://thinkers50.com/wp-content/uploads/The-Rise-of-the-Sharing-Economy.pdf

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Car Sharing – Ride Sharing

Taxonomy of Innovative Mobility Services

Service	Role of Technology	Problems Technology May Solve	Factors in Success
Carsharing (examples: Zipcar, car2go)	Reservations and tracking of vehicles; billing	Convenience in making and changing reservations and in locating and dropping off vehicles; national branding encourages use while traveling	Critical mass of users to support availability of vehicles at a sufficient array of pickup or drop-off locations
Bikesharing (examples: Citi Bike, Divvy, Capital Bikeshare)	Reservations and tracking of bikes; billing	Convenience in finding bikeshare stations and information on bike availability; management of rebalancing	Critical mass of users to support a sufficient array of bike stations; rebalancing of bikes to ensure availability
Transportation network companies—sequential sharing (examples: Uber, Lyft)	Reservations and tracking of vehicles; billing; quality control via online customer feedback	Convenience of arranging ride just prior to travel; customer tracking of vehicles and wait times reduces uncertainty; national branding encourages use while traveling	Critical mass of users to support widespread vehicle availability

Source: Transportation Research Board (2016) Between Public and Private Mobility: Examining the Rise of Technology-Enabled Transportation Services, Transportation Research Board Special Report 319, Committee for Review of Innovative Urban Mobility Services, Transportation Research Board.

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Car Sharing – Ride Sharing

Taxonomy of Innovative Mobility Services

Transportation network companies—concurrent sharing (examples: UberPool, LyftLine)	Reservations and tracking of vehicles; billing; matching of riders for shared rides; quality control via online customer feedback	Convenience of arranging ride just prior to travel; customer tracking of vehicles and wait times reduces uncertainty; national branding encourages use while traveling	Critical mass of users to support widespread vehicle availability; comfort with riding with strangers; critical mass to match riders for shared rides
Microtransit (examples: Bridj, Chariot)	Reservations and tracking of vehicles; determining routes from public demand; billing	On-board wi-fi and efficient routing to match customer demand; customer tracking of vehicles and wait times reduces uncertainty	Critical mass of users to support a variety of routes; comfort with riding with strangers; price points that, while higher than those of standard transit, allow for regular commuting
Taxi apps or e-hail (examples: Flywheel, Curb, myTaxi)	Easier reservations, both advance and just prior to travel	Apps may cover multiple taxi companies and estimate wait time, reducing uncertainty; national branding could encourage use while traveling	Critical mass of participating taxi companies; integration with traditional taxi operations; app use by traditional customer base

Source: Transportation Research Board (2016) Between Public and Private Mobility: Examining the Rise of Technology-Enabled Transportation Services, Transportation Research Board Special Report 319, Committee for Review of Innovative Urban Mobility Services, Transportation Research Board.

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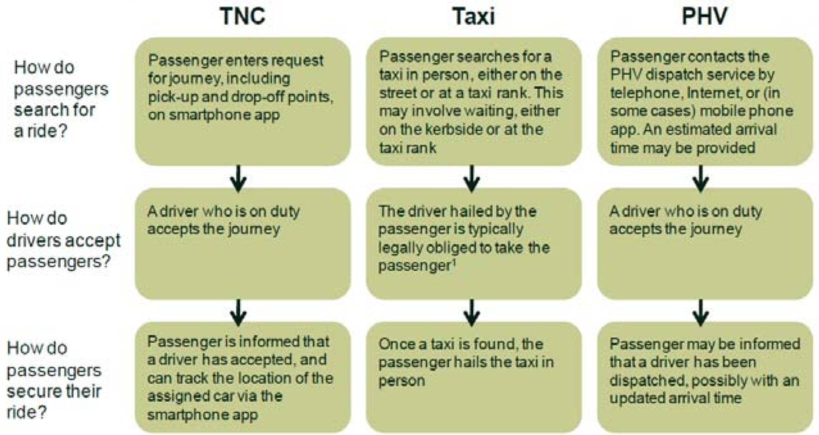
Transport Network Companies and Taxi Industry

Figure 1 How do passengers obtain a ride?



Note: [1] Many jurisdictions require taxis to take any journey within a specified district, unless there is a good reason not to. This is the case in Great Britain—see The Institute of Licensing (2009), 'Taxis – An Overview', p. 2.
Source: Oxera.

Source: http://www.oxera.com/Latest-Thinking/Agenda/2014/Is-the-ride-right-Transportation-networkcompanies.aspx

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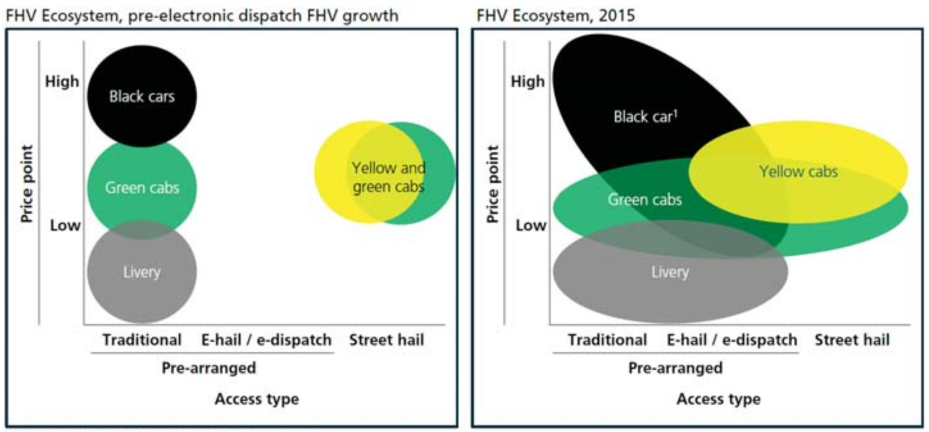
Effect of technological change

Due to technological advances, once-distinct regulatory categories are blurring



In NYC, Uber and Lyft are categorized as black cars, not as a separate category
Interviews with industry players, experts, consumers, and TLC, and review of TLC regulations

Source: City of New York (2016) For-Hire Vehicle Transportation Study, January 2016

TDRI UBER – International Comparison (As of 2015)

	UberPOP	UberBlack
Belgium (Brussels)	• Prohibited by a judge. • Regions have announced they will revise regulations. The type of revision is unclear.	• Not offered.
Germany	• For procedural reasons the national ban was revoked. • Banned in Berlin, Hamburg and Düsseldorf; the situation in Frankfurt and Munich is unknown. • In the three cities where it is banned, Uber drastically lowered its fares in order to adhere to the law – in practice this means that no Uber services are offered.	• Banned in Berlin and Hamburg, allowed other cities as far as is known. • UberBlack is no longer offered in Berlin. • UberTaxi was introduced in various cities and adheres to legal requirements.

Source: Rienstra, S., Bakker, P., and Visser, J. (2015) International comparison of taxi regulations and Uber, KiM Netherlands Institute for Transport Policy Analysis, March 2015.

TDRI UBER – International Comparison (As of 2015)

	UberPOP	UberBlack
France	• Following various legal challenges with varying judicial decisions, the law was changed as of 1-1-2015, to which UberPOP in practice cannot adhere. • Various court cases are ongoing.	• No legal proceedings, as far as is known.
Spain	• UberPOP is banned on the national level. • As of 31-12-2014, Uber has withdrawn from Spain.	• Is not offered.
Czech Republic	Introduced in December – no inspections conducted yet (as of late January). • Cars and drivers must adhere to requirements for taxis (taxi meter, sign on roof, license).	• Falls under the taxi regulation. Cars must adhere to requirements (taxi meter, sign on roof) and drivers and cars must have taxi licenses. • Fines are therefore issued – appeal procedures currently ongoing.

Source: Rienstra, S., Bakker, P., and Visser, J. (2015) International comparison of taxi regulations and Uber, KiM Netherlands Institute for Transport Policy Analysis, March 2015.

TDRI UBER – International Comparison (As of 2015)

	UberPOP	UberBlack
UK	• Is not offered.	• There are legal proceedings underway, but Uber has seemingly been largely accepted. • Uber has also introduced UberTaxi in London, which adheres to the legal requirements for taxis.
Other EU countries	• In Italy, a court case is underway in Milan. • No information found about any legal proceedings launched in Poland.	• The services were introduced in 10 other EU countries.

Source: Rienstra, S., Bakker, P., and Visser, J. (2015) International comparison of taxi regulations and Uber, KiM Netherlands Institute for Transport Policy Analysis, March 2015.

TDRI UBER – International Comparison (As of 2015)

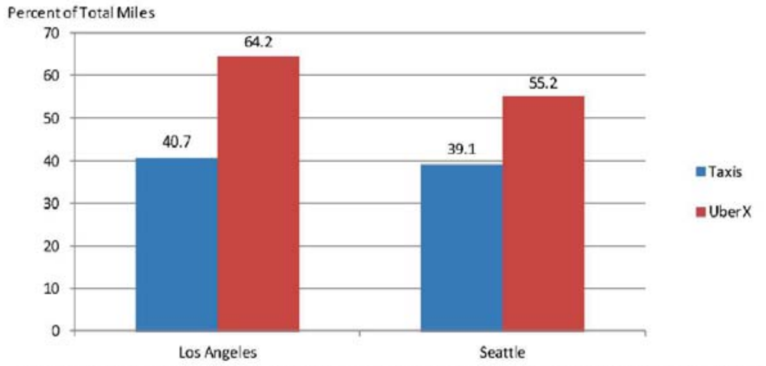
	UberPOP	UberBlack
Other countries	*Brazil* • Is not offered.	• Is offered in Sao Paulo and Rio de Janeiro. Court cases launched in both cities.
	New-Zealand • New Zealand: offered in some cities. No legal proceedings as far as is known.	• Is not offered.
	China • National ban.	• Permitted.
	US • Major differences per city and state. Permitted in some, banned in others.	• Major differences per city and state. Permitted in some, banned in others.

Source: Rienstra, S., Bakker, P., and Visser, J. (2015) International comparison of taxi regulations and Uber, KiM Netherlands Institute for Transport Policy Analysis, March 2015.

TDRI Effect of Ride Sharing App. - UBER

- UBER has higher capacity utilization rate.

Figure 1: Capacity Utilization Rate (Percent of Miles Driven with a Passenger) for Taxi and UberX Drivers in Los Angeles and Seattle



Source: Uber Technologies, Inc.; LADOT; City of Seattle, Regulatory Compliance and Consumer Protection Division; Authors' calculations.
Notes: LA and Seattle are 2013-14 and Uber is the 12 months ending December 1, 2015; see text for further details.

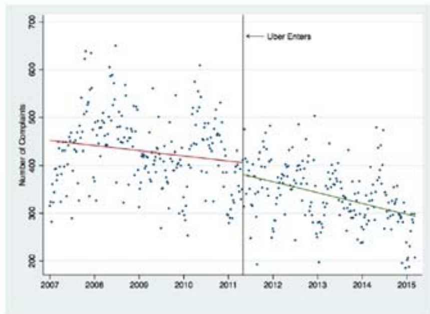
Source: Cramer, K., & Krueger, A. (2016). Disruptive Changes in the Taxi Business: The Case of Uber. National Bureau of Economic Research. http://www.nber.org/papers/w22083

TDRI How is UBER changing taxis?

- Taxi Rides declines in NYC after UBER's entrance, so the taxi's complaints.

Figure 1: Daily Taxi Trips (Thousands)

Figure 2: Number of Taxi Complaints Submitted to NYCTLC

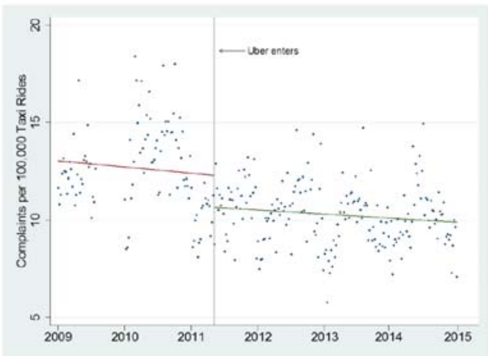


Source: Wallsten, S. (2015) The Competitive Effects of the Sharing Economy: How is Uber Changing Taxis?, Technology Policy Institute.

TDRI How is UBER changing taxis?

- The results from New York City and Chicago are consistent with the idea that taxis respond to new competition by improving quality.

Figure 3: Taxi Complaints per Hundred Thousand Rides



Source: Wallsten, S. (2015) The Competitive Effects of the Sharing Economy: How is Uber Changing Taxis?, Technology Policy Institute.

TDRI Effect of Ride Sharing App. – Case of China

TABLE 1 The average of MUR, VRF and ADMI

Groups \ Categories	MUR	VRF	ADMI
Before ABRs enter	69%	8558	6596
After ABRs entre	62%	6902	5048
The Rate of Decline	10.1%	19.3%	23.4%

MUR: Mileage Utilization Ratio, VRF: Vehicle Rent Fee, ADMI, Average Drivers' Monthly Income

The data indicates that the ABR services have the significant impacts on taxi industry. The taxi revenue drop quickly and presented a continuous descending trend. ... This is a vicious cycle: the vehicle vacant hours are increasing, and taxi drivers need to work more time while have lower income. In fact, the worsening taxi market situation has led to taxi drivers' strike in April 1, 2016.

Source: Sun, Z., Yu, M., Zeng, J., Wang, H., and, Tian, Y. (2016) Assessment of the Impacts of App-based Ride Service on Taxi Industry: Evidence from Yiwu City in China, Paper submitted to TRB Committee on Paratransit (AP060) For Presentation and Publication at the 96th Annual Meeting of Transportation Research Board January 8-12, 2017, Washington, D.C.

UBER – Negative View

Uber's Fundamental Illegality

Uber brought some important improvements to the taxi business, which are at this point well known. But by the company's launch, in 2010, most urban taxi fleets used modern dispatch with GPS, plus custom hardware and software. In those respects, Uber was much like what incumbents had and where they were headed.

It was Lyft that first invited drivers to provide transportation through their personal vehicles. Indeed, Uber initially provided service only through licensed black cars properly permitted for that purpose. But as Lyft began offering cheaper service with regular cars, Uber had to respond.

Source: Edelman, B. (2017) Uber Can't Be Fixed — It's Time for Regulators to Shut It Down, Harvard Business Review, https://hbr.org/2017/06/uber-cant-be-fixed-its-time-for-regulators-to-shut-it-down

UBER – Negative View

Rotten to the Core

Uber faced an important challenge in implementing this strategy: It isn't easy to get people to commit crimes. Indeed, employees at every turn faced personal and professional risks in defying the law; two European executives were indicted and arrested for operating without required permits. But Uber succeeded in making lawbreaking normal and routine by celebrating its subversion of the laws relating to taxi services. Look at the company's stated values – "super-pumped," "always be hustlin'," and "bold." Respect for the law barely merits a footnote.

Source: Edelman, B. (2017) Uber Can't Be Fixed — It's Time for Regulators to Shut It Down, Harvard Business Review, https://hbr.org/2017/06/uber-cant-be-fixed-its-time-for-regulators-to-shut-it-down

UBER – Negative View

Fixing the Problem

Take the case of Napster. Napster was highly innovative, bringing every song to a listener's fingertips, eliminating stock-outs and trips to a physical record store. Yet Napster's overall approach was grounded in illegality, and the company's valuable innovations couldn't undo the fundamental intellectual property theft. Under pressure from artists and recording companies, Napster was eventually forced to close.

But Napster's demise did not doom musicians and listeners to return to life before its existence. Instead, we got iTunes, Pandora, and Spotify – businesses that retained what was great and lawful about Napster while operating within the confines of copyright law.

Source: Edelman, B. (2017) Uber Can't Be Fixed — It's Time for Regulators to Shut It Down, Harvard Business Review, https://hbr.org/2017/06/uber-cant-be-fixed-its-time-for-regulators-to-shut-it-down

Issues of Ride-Sharing App

- Regulation / Level of Playing Field
- Labor and Employment Issues
- Personal Security and Public Safety
- Insurance
- Equity and Access

< 3rd AFTERNOON SESSION >

Session 3: Parallel Session of Main Annual Conference (Symposium)

Session 3B: Logistic & Disaster Management
Moderated by Dr. Siradol Siridhara Mahidol University, Thailand
Eco-Navigation Planning System for Domestic Vessel "ECoRo" By Ms. Yoshiko SATO Engineer of Disaster Mitigation Solutions Department, Japan Weather Association, Japan
Truck Operating Cost in Thailand By Asst. Prof. Dr. Varameth Vichiensan Kasetsart University, Thailand
Disaster Management in Thailand By Col.Dr. Thai Charnkol Engineering Battalion Commander, Royal Thai Army, Thailand
Disaster Preparedness and Response in the Philippines: The Case of Earthquakes By Prof.Dr. Alexis M. Fillone President of Transportation Science Society of the Philippines
How to Distribute Relief Goods at the Large-scale Earthquake: Learning from Japan Earthquake in 2011-2016 By Prof. Dr. Satoru KOBAYAKAWA Dept. of Transportation Systems Engineering, Nihon University, Japan

Moderator of <Session 3B>

Dr. Siradol Siridhara
Mahidol University, Thailand
E-mail: siradol74@yahoo.com

Brief Biography:

Dr. Siridhara has more than years professional experience in traffic engineering and transport planning. He has involved in many aspects of transportation engineering and feasibility studies including railway engineering, transportation planning, parking studies, traffic impact assessment and project economic and financial evaluation.

He spent two years of his professional career in the United States as a transportation planner. He continued his career in Thailand with Wilbur Smith Associates for eight years before taking a lecturer position at Suranaree University of Technology. He has become a lecturer at the Cluster of Logistics and Railway Engineering, Mahidol University from 2016 until present

Education:

2000	*Ph.D. Civil Engineering (Transportation), Virginia Tech.*
1997	*M.S. Civil Engineering, University of Texas - El Paso.*
1994	*B.S. Civil Engineering, Chulalongkorn University.*

Employment Record

2016 - Present	*Lecturer, Mahidol University*
2010 - 2015	*Lecturer, Suranaree University of Technology*
2002 - 2009	*Senior Transportation Engineer, Wilbur Smith Associates (Now CDM Smith)*
2000 – 2002	*Transportation Engineer, DMJM+HARRIS (Now AECOM)*
1997 - 2000	*Teaching Assistant,Civil Engineering Department, Virginia Tech*
1995 – 1997	*Research Assistant,Civil Engineering Department, University of Texas El Paso*
1994 -1994	*Civil Engineer,SEATECH Consultants*

First Speaker of <Session 3B>

Ms. Yoshiko SATO
Engineer of Disaster Mitigation Solutions Department,
Japan Weather Association, Japan
E-mail: ysato@jwa.or.jp

Brief Biography:

Ms. Yoshiko Sato (born in Yamanashi Prefecture, Japan, in 1978) received her M.E. degree in distribution the information from Tokyo Mercantile Marine University in 2014. She has been a researcher at Japan Weather Association and has been following the weather routing system for domestic vessel since 2009.

Education

- *2004 Master in Engineering Tokyo University of Mercantile Marine, Japan*
- *2001 Bachelor in Engineering Tokyo University of Mercantile Marine, Japan*
-

Work Experiences:

2009-2011	*Practical development of the Eco-Navigation Planning System for domestic vessel and consideration of land traffic Information cooperation.*
2011	*Demonstration experiment of rationalization for Eco-Navigation Planning Operation*
2012	*Feasibility study for a project for optimization of cement carrier operation in Indonesia*
2012	*Possibility research of applying technologies to promote modal shift expansion on marine transportation*
2013	*Demonstration experiment of a project for optimization of cement carrier operation in Indonesia*
2013	*The launch of ECoRO service, the Eco-Navigation Planning information provision*
2014-2015	*Improving accuracy of wave information using the ship radar and consideration of its effective use*
2015	*Promotion project of modal shift expansion on domestic vessel by improvement of transportation quality*
2016-2017	*Development of the combined information service of ship data, weather and oceanographic data*

Awards Received:

2017	*Hydrographic technology encouragement award, Japan Hydrographic Association*

Eco-Navigation Planning System for Domestic Vessel "ECoRo"
By Ms. Yoshiko SATO

Summary:

Energy-saving navigation (Eco-Navigation) for domestic vessels is an important subject these days. The Eco-Navigation Planning System minimizes fuel consumption by optimal route and speed planning using highly precise weather and oceanographic prediction and ship performance estimation. Coastal vessels have little choice on route selection, so it is important to select strictly effective courses to achieve FOC reduction. In order to solve this problem, we have developed more highly precise and high-resolution weather and oceanographic prediction than in the past.

The vessel propulsion performance is usually estimated by its line plans and various monitoring data. However, we devised a simplified estimation method only using basic dimensions. Thus, we could reduce the cost and time of implementing this system. We did many experiments and introduction results for this Eco-Navigation Planning System. And we have proved about 4% of FOC reduction effect on average for all vessels. Also, we've done experiments for overseas areas such as Indonesia, Shanghai and Korea, and had almost the same results. It is possible to reduce the greenhouse gas amount of emission in all sailing of domestic vessels using this system, and to employ as a global warming prevention countermeasure as well.

The Marine Bureau in Japan established the "The rating system for domestic vessels" for one of the promotion measures as a maritime environmental protection to save energy. The Global Warming Prevention Headquarters which were determined in the Paris Agreement is behind this provisions. And the reduction target in this scheme is "at least 1.57 million ton reduction of CO2 emissions on coastal shipping by 2030 compared with 2013". Additionally, our Eco-Navigation Planning System is recommended as the system which satisfies the requirement of the tax benefit called "Act on special measures concerning taxation" from April 2017. This can be applied to not only the newly constructed vessels but also the vessels in service. This will encourage seven more promotion of the Eco-Navigation Planning System.

Additionally, shipping companies are putting the emphasis on an energy conservation measure from both sides of hardware and software with the soaring of fuel price in recent years. By using our Eco-Navigation Planning System, it is possible to get the energy saving effect by only selecting the optimum route and shipping companies can reduce navigation cost effectively.

日本気象協会

ASIA TRANSPORTATION RESEARCH SOCIETY
18th Aug. 2017

Eco-Navigation Planning System for Domestic Vessel "ECoRO"

Yoshiko SATO
Japan Weather Association
Disaster Mitigation Solutions Department

日本気象協会

Introduction

As is ...

- ○ **Navigation time is mostly short, but the schedule is frequent.**
- ○ **Ship Course is almost stable, not selected by each voyage.**
- ○ **Trampers used to wait off the arrival port.**

To be ...

- ○ **At least 1.57 million ton CO2 reduction emissions by 2030 compared with 2013".**
- ○ **According to The Global Warming Prevention Headquarters determined in the Paris Agreement.**

- To make the operation of domestic vessel more efficient.
- To plan fuel-saving route (optimum route).
- On-time speed planning with considering uncertainty of prediction.

日本気象協会

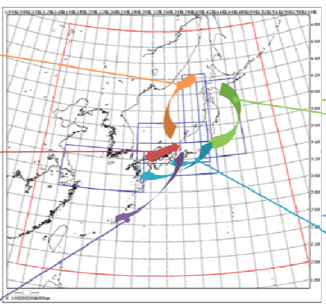
Object of Eco-Navigation Planning System

This system *increase the benefit of Shipping companies* by planning the optimal route with using Weather and Ocean forecast.

日本海航路
- 津軽海峡を通航する場合、津軽暖流を利用/避ける効果が得られる
- 冬季は海上風、海上波浪による影響が大きく、これらによる速力低下が最小となる航路を選択する

瀬戸内海
- 航路選択の幅はほぼないと考えられる
- 潮流の影響が強いため、着時刻予測が有効である（航路は固定）
- 潮流情報の利用が可能

沖縄航路
- 黒潮の流れに沿った長距離航路
- 順潮航路では流軸に近い航路を、逆潮航路では黒潮を避ける航路を選択する



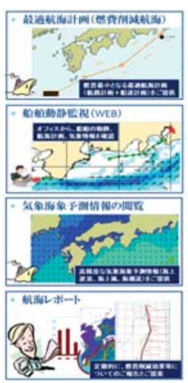
赤枠： ECoROサービスエリア（6NMメッシュ）
青枠： 詳細情報使用範囲（2NMメッシュ）

北航路
- 津軽暖流の影響が強い
- 北上航路は、逆潮を避け速力低下を抑える
- 南下航路は、津軽暖流を利用し、低出力で船速を保持する

黒潮航路
- ECoROで最も大きな省エネ効果が得られる
- 東上航路では、黒潮を利用し、低出力で船速を保持する
- 西下航路では、逆潮を避け速力低下を抑える

	北航路	黒潮航路	沖縄航路	日本海航路
削減効果	2～5%	3～5%	1．5%	1～2%

Provision Information



FOC reduction effect differs depending on the navigation area.

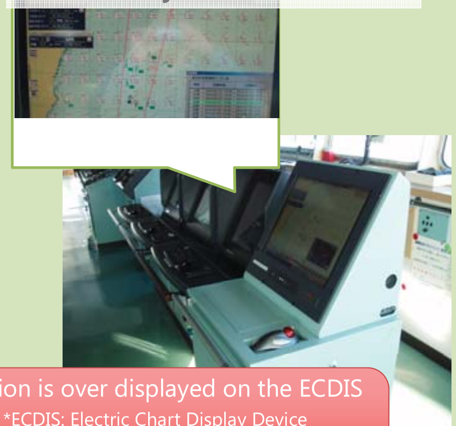
*FOC: Fuel oil consumption effect

日本気象協会

A case of implementing the system

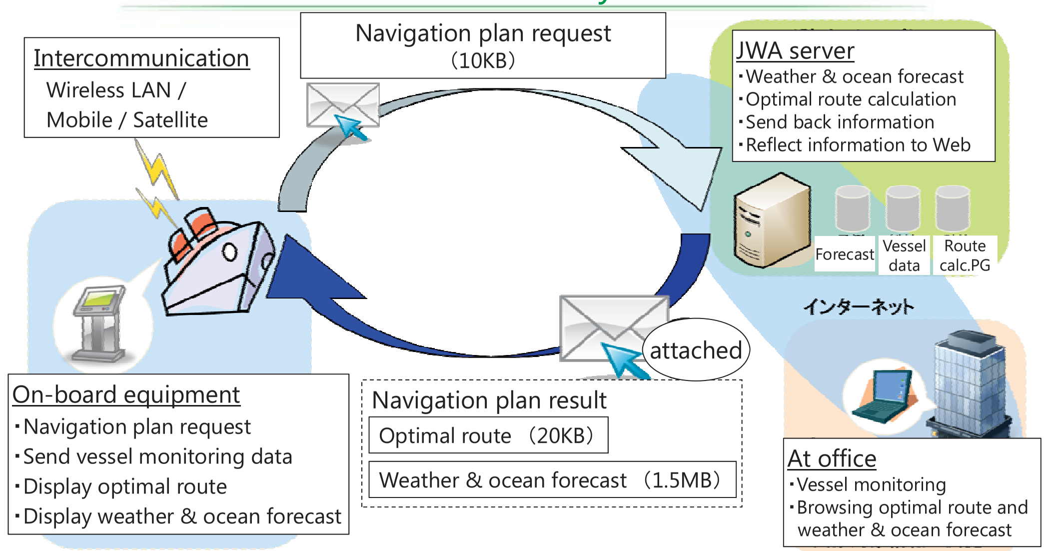
For the vessels in service

For the newly construction vessels

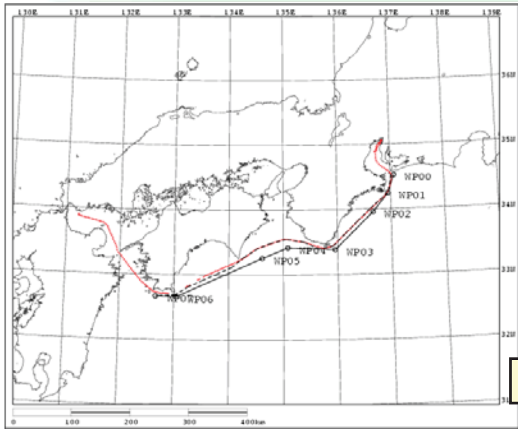


- In Japan, the Eco-Navigation information is over displayed on the ECDIS corresponding to customer's needs. *ECDIS: Electric Chart Display Device
- But it is possible to provide the Eco-Navigation information by E-mail, FAX or Web.

Outline of the system



Optimum-route planning and its FOC reduction effect



Usua - Optimum - Actual route

Usual route Standard route.	———
Optimum route Route calculated by ECoRO.	- - - - - -
Actual route Route that ran in practice.	——— (red)

Usual route: 100
Optimum route: 93.5

FOC Reduction: 6.5%

FOC Reduction Effect

$$Effect_{FOC} = 100 - (FOC_{RECOMMEND} / FOC_{USUAL}) \times 100 \quad (\%)$$

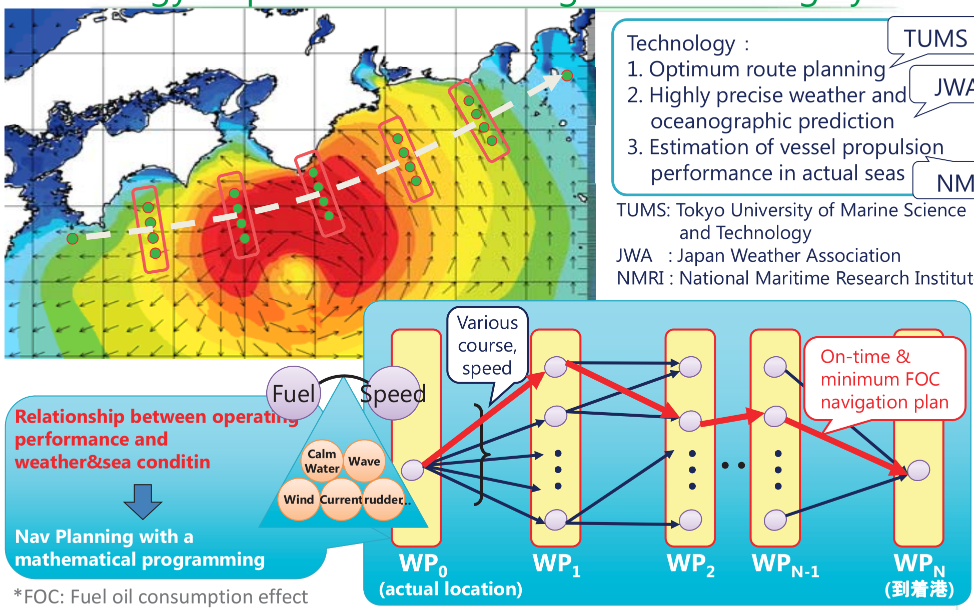
$Effect_{FOC}$: FOC reduction effect; $FOC_{RECOMMEND}$: FOC of Recommended Route; FOC_{USUAL}: FOC of Usual Route

*FOC: Fuel oil consumption effect

Technology required for Eco-Navigation Planning System

Technology:
1. Optimum route planning (TUMS)
2. Highly precise weather and oceanographic prediction (JWA)
3. Estimation of vessel propulsion performance in actual seas (NMRI)

TUMS: Tokyo University of Marine Science and Technology
JWA : Japan Weather Association
NMRI : National Maritime Research Institute



*FOC: Fuel oil consumption effect

Overview of weather and oceanographic forecast

Information	Model	Summary	Spatial Re-solution	Frequency
SEA SURFACE WIND	MSM/GSM JMA	Using MSM model by JMA at resolution of 5km for until 33 hour, and GSM model by JMA at resolution of 20km for at and after 33 hour.	2NM (3.7km)	8 times/day (every 3H)
OCEAN WAVES	JWAve JWA	JWA Wave Model, calculated by 3rd generation wave model WAM tuned for SYNFOS. In addition, it's assimilated by Coastal Wave Observation data.	2NM (3.7km)	8 times/day (every 3H)
OCEAN / TIDAL CURRENTS	JCOPE JAMSTEC	JAMSTEC Current Model, calculated by POM at resolution of 1/36 degree, including Ocean, tidal and wind driven current around East Asia by JAMSTEC, then extrapolated at resolution of 2 NM.	2NM (3.7km)	Once/day (every 3H)
SEA FOG	HIMAWARI-8 JWA	Fog Index is calculated using difference of 4 infra-red sensor of Japanese satellite named HIMAWARI	2NM (3.7km)	Every 30 min.

* Accuracy of all forecasted data is ...
highly improved by assimilation with using observed data.

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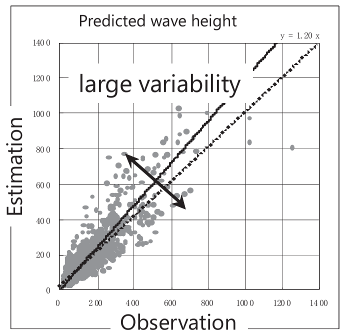
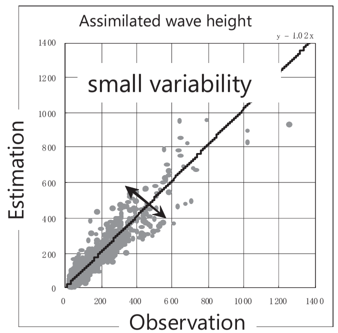
Accuracy of verification examples of wave height at Kochi (in 2009)

Before Assimilation



After Assimilation



After assimilation, much more accurate

at KOCHI	1 day	2 days	3 dais
correlation coef.	0.815	0.754	0.683
regrresion coef.	0.994	1.052	1.134
average error ratio	15.5	17.3	28.6
RMSE	38.1	45.4	56.3

at KOCHI	1 day	2 days	3 dais
correlation coef.	0.906	0.841	0.779
regrresion coef.	1.004	0.997	1.025
average error ratio	5.7	7.9	14.9
RMSE	22.0	32.3	38.3

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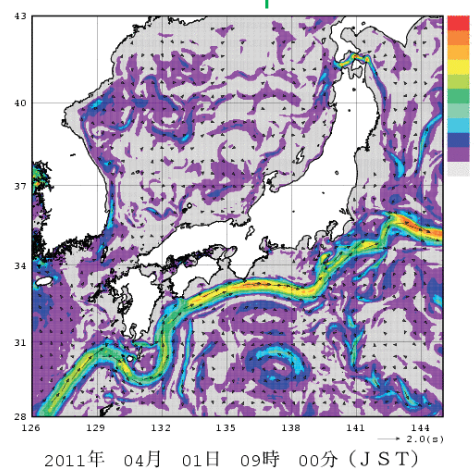
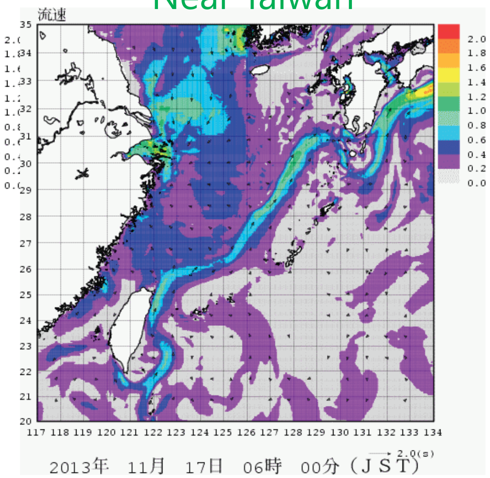
Utilization of ocean current（Kuroshio）

Near Japan



Near Taiwan



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Estimation of vessel propulsion performance

Estimate the relationship of FOC and ship speed under the weather
➡ To select minimum FOC route / On-Time ship speed Planning

1. Estimate ship-performance from Drawings

Drawings	Estimation item
・General Arrangement	・Water resistant loss
・Loading Manual	・Wind resistant loss
・Cross-section shape	・Rotation moment loss
・Official Trial Data	・Wave resistant loss

2. Tuning of performance estimation from Monitoring data

Monitoring	Tuning
・AIS（position, course）	Adjust the factor by monitoring data from actual voyage, and fit to actual FOC (fuel counter measurements).
・Log Speed	
・Fuel Counter	
・M/E Output etc...	

*FOC: Fuel oil consumption effect

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Consideration of simplified system

Current system is effective but …
takes many times and cost for introduction.

We considered the ***simplified method*** to reduce the cost and time of implementing the system.

Method		Standard	Simplified
Definition		Using initial performance estimation.	Reduce the amount of data for estimation.
Data	Navigation Information	15 items	6 - 7 item
	Main Engine Information	39 items	5 - 17 item
	Ship Hull Information	73 items	2 - 6 item
	General Arrangement	○	○
	Speed Trial Results	○	○

We can also make the ***standard vessel model*** which is useful for implementing to the large amount of vessels.

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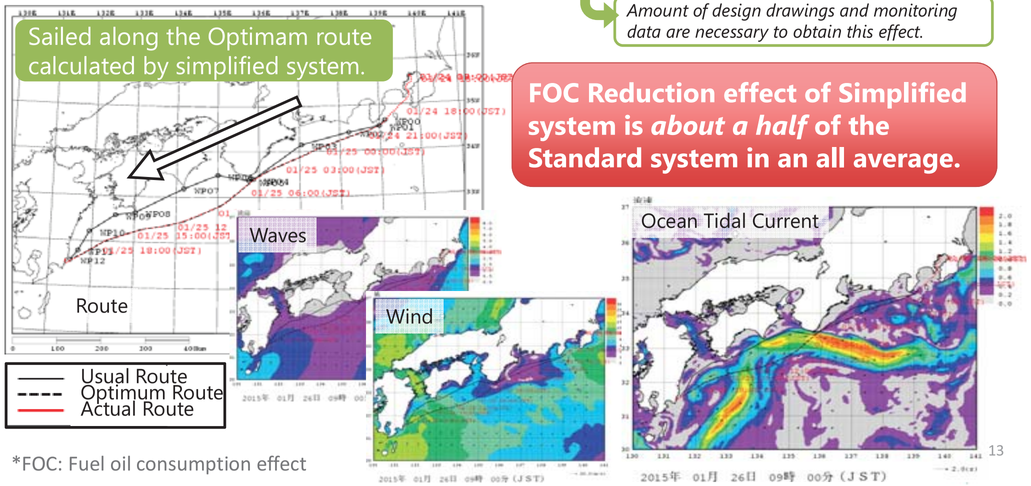
A Case of Eco-Navigation by Simplified System

Departure	Arrival	ETD	ETA	Reduction of Fuel Oil Consumption (Standard)	Simplified	Actual
Tokyo	Aburatu	01/24 18:52	01/25 20:38	(16.3 %)	6.0 %	5.8 %

Amount of design drawings and monitoring data are necessary to obtain this effect.



FOC Reduction effect of Simplified system is *about a half* of the Standard system in an all average.

*FOC: Fuel oil consumption effect

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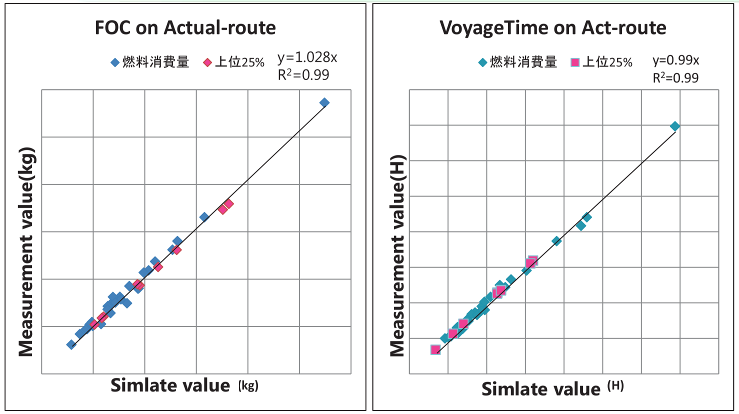
Estimate Accuracy on Simulation



Both coefficient of regression and coefficient of determination are almost "1". ⇒ Captured the tend statistically.

This system can estimate the optimum route in several % of error range

(example)
・Error of navigation time is 2%
・Total navigation time is 30H

Estimated error is...
・35minutes at departure point.
・4minutes at last Watch.

Possible to estimate the FOC statistically corrected.

*FOC: Fuel oil consumption effect

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Comments by its Users

- It is capable of enhancing consciousness of not only vessel operators but also navigation officers for energy saving by using this system.
- It is easy to implementing, especially the simplified system.
- It is capable of uniformizing the FOC reduction effect, and minimizes individual variation.

*FOC: Fuel oil consumption effect

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Awards

Awards		
Prize for Environmental Logistics	2016. 6. 27	Japan Association for Logistics and Transport
Energy Conservation Grand Prize for excellent energy conservation equipment	2017. 1. 23	Energy Conservation Center, Japan
Hydrographic Technology Encouragement Award	2017. 3. 8	Japan Hydrographic Association

Prize for Environmental Logistics

ネスレ日本株式会社、川崎近海汽船株式会社、日本気象協会３社連名

Energy Conservation Grand Prize for excellent energy conservation equipment

相模屋食料株式会社、株式会社Mizkan、ネスレ日本株式会社、川崎近海汽船株式会社、日本気象協会５社連名

Hydrographic Technology Encouragement Award

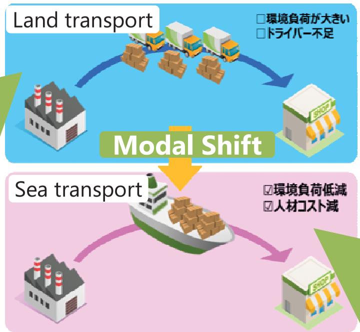
受賞題目：「内航船向け最適航海計画支援システムの開発 商用化」

Cooperation with Modal Shift

As is …

Current situation of land transport in Japan

- An acute shortage of truck drivers.
- One 499 coastal vessel can deliver 160 truck-load of products.



A case of modal shift
-demonstrated in 2017-

To be …

Promotion of modal shift

In this case, *48% of CO2 reduction* is obtained by…
- ***Shift transportation from by land to by sea.***
- ***To use eco-navigation planning system.***

Energy-conservation policies in Japan

As is …	To be …
○ Difficult to implementing the eco-navigation system for vessels in service. ○ CO2 reduction effect is obtained by the vessels only under the limited circumstances.	○ At least 1.57 million ton CO2 reduction emissions by 2030 compared with 2013". ○ According to The Global Warming Prevention Headquarters determined in the Paris Agreement.

- "The rating system for domestic vessels" from August 2017.
- The tax benefit called "Act on special measures concerning taxation" from April 2017.

*FOC: Fuel oil consumption effect

Conclusion

- We developed the Eco-Navigation Planning system and demonstrated an average of 4% FOC reduction effect in an average.
- We verified equivalent effect on FOC observation in the actual route.
- Devised the simplified system to reduce the burden of introduction. It's FOC reduction effect is about a half as the standard system.
- With using this Eco-Navigation Planning System, vessel can easily obtain the FOC reduction effect.
- This system is also used for the energy-conservation policies in Japan.

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Thank you for your attention !!

Second Speaker of <Session 3B>

Assistant Professor Varameth Vichiensan
Faculty of Engineering,Department of Civil Engineering
Kasetsart University
E-mail: fengvmv@ku.ac.th

Brief Biography:

Education

- *B.Eng. (Civil Engineering)*
  Thammasat University, Thailand
  (SIIT Scholarship)
- *M.Eng. (Civil Engineering)*
  Asian Institute of Technology, Thailand
  (Royal Thai Government Scholarship)
  (Outstanding Academic Record Award)
- *Ph.D. (Civil Engineering)*
  Tohoku University, Japan
  (Japanese Government Scholarship)

Academic Society

- *Scientific Committee, World Conference on Transport Research (WCTR)*
- *Co-Chair of Special Interest Group H5: Transport in Developing Countries, World Conference on Transport Research Society (WCTRS)*
- *Research Committee, Asian Transportation Research Society (ATRANS)*
- *Sub-Committee on Transport & Traffic Eng., Engineering Institute of Thailand (EIT)*
- *Executive Committee, Thai Association for Town Planning (TATP)*

Areas of Interest

- *Integrated Land Use/Transportation Modeling*
- *Discrete Choice Analysis*
- *Spatial Analysis*
- *Freight Transport*
- *Driver Education and Licensing*

Truck Operating Cost in Thailand
By Asst. Prof. Dr. Varameth Vichiensan

Summary:

Truck operating costs are a function of decisions made by a company or owner/operator. The differences in equipment characteristics, and operational structure, along with different trip characteristics, result in a somewhat unique cost structure for a particular movement and/or firm. Firm costs such as fuel, insurance, labor, maintenance and repair costs vary depending on geography, new versus used, and freight being transported. Literature review reveals that USA and Japan are looking at the operating cost elements over time. This needs a simple structure that is applicable to most of the truck operators. This study proposed a general truck operating cost model that consists of fixed and variable costs. Fixed costs include vehicle cost and depreciation, vehicle registration and license fee, insurance for vehicle and goods, as well as other unaccountable expenses. Variable costs, which may vary by operating distance and time, include office rent, telephone, internet, staff salary, driver & assistance, operator license, server, unaccountable expense, fuel, tire, lubricating oil, vehicle fixing and maintenance, etc. A software model is developed to calculate truck operating cost for many commodities using different truck equipment combinations and input prices. It calculates a unit cost per kilometer for a particular trip, based on the firm operation and management information input. The model is built as a stand alone under Microsoft Excel environment with VBA macros. This provides flexibility to users (truck operator) to configure and modify the costing model that exactly matches their operation and needs. At the end, the paper demonstrates the model application to see the truck operating cost sensitivity by different type of vehicle, fuel, firm size, etc.

Truck Operating Cost in Thailand

Varameth Vichiensan
Assistant Professor
Department of Civil Engineering
Kasetsart University

Outline

- **Review**
  - Costing Model
- **Cost calculating tool**
  - USA
  - Thailand
- **Cost structure example**
  - USA
  - Japan
- **Truck Operating Cost for Thai Trucking Industry**
  - Cost structure
  - Cost items
- **Calculation tool**
  - Program
  - Application

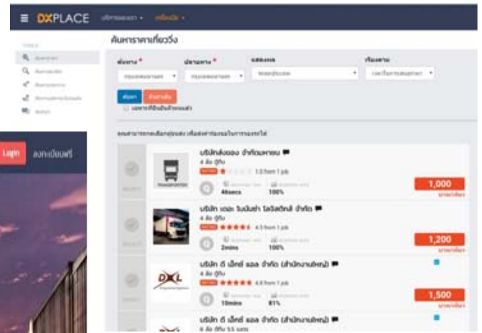
Freight Transport Cost, Thailand

By Mode	Transport Cost (Baht/ton)
Road	40
Rail	8
Water	2
Air	710

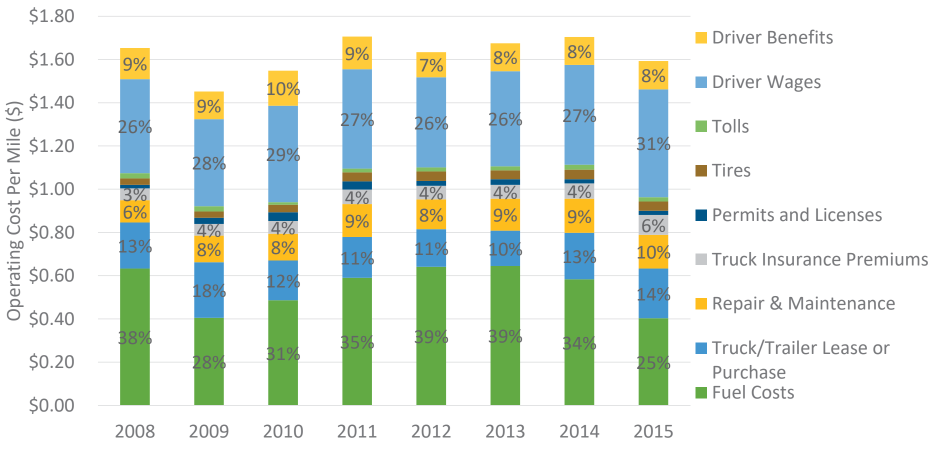
By Commodity Type	Average Transport Cost (Baht/ton-km)			
	Road	Rail	Water	Air
กลุ่มสินค้ากสิกรรม	1.64	0.93	0.66	10.00
กลุ่มสินค้าประมง	2.65	-	-	-
กลุ่มสินค้าปศุสัตว์	2.93	-	-	-
กลุ่มสินค้าอุตสาหกรรมการเกษตร	1.58	0.94	0.71	-
กลุ่มสินค้าอุตสาหกรรม	2.35	0.95	0.64	-
กลุ่มสินค้าแร่และเชื้อเพลิง	2.32	0.94	0.65	-
กลุ่มสินค้าผ่านแดน	3.50	-	0.70	-
กลุ่มสินค้าเพิ่มเติมสำหรับการขนส่งในประเทศ	2.01	-	0.64	-

Source: OTP (2011)

Transport Market Place

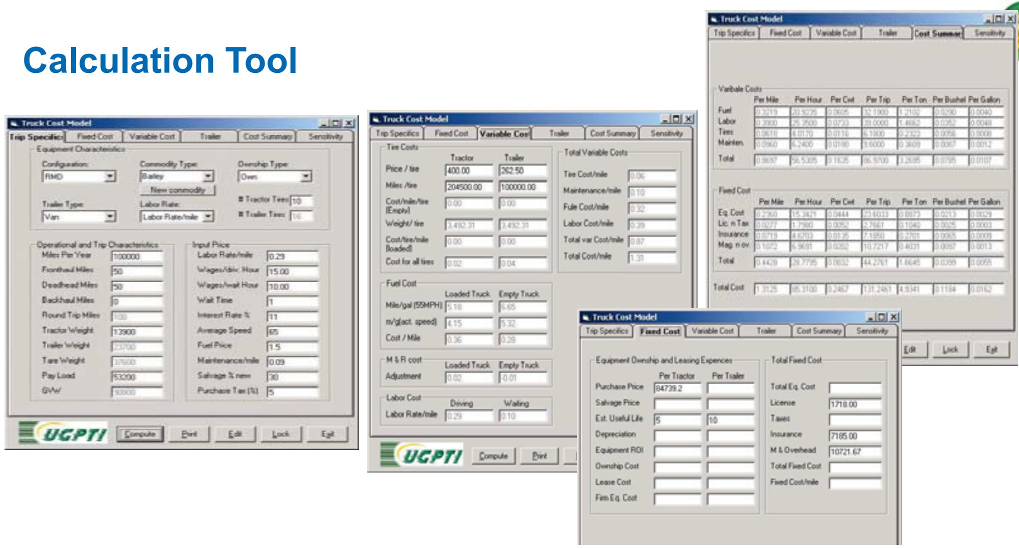


Operational Cost of Trucking, United States



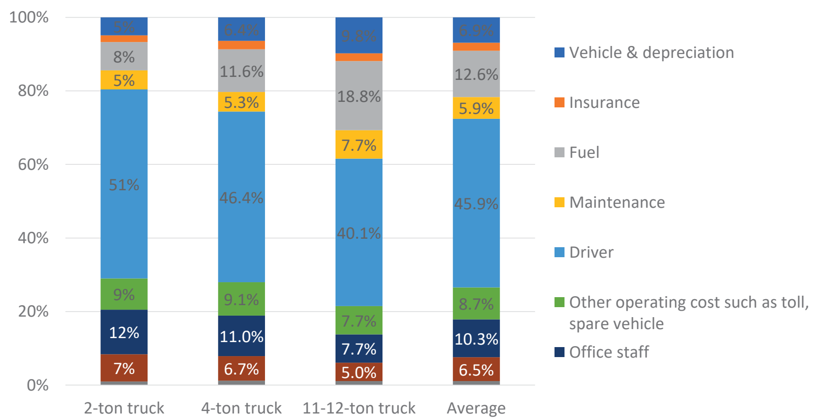
Source: Adapted from An Analysis of the Operational Costs of Trucking (2016)

Calculation Tool



Truck Costing Model for Transportation Managers North Dakota State University (2003)

Truck Operating Cost, Japan



Source トラック運送事業の運賃・原価に関する調査 調査報告書 (2011)

Cost Structure

❖Fixed Costs

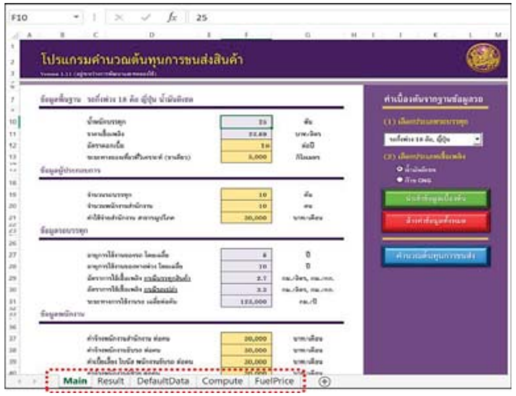
- Registration and license
- Insurance
  - vehicle
  - goods
  - Third party
- Depreciation
- Equipment, GPS
- Unaccountable expense

❖Variable Costs

- Office rent, expense
- Telephone, internet
- Salary
  - Office staff
  - Driver & assistance
- Operator license
- Server
- Unaccountable expense
- Fuel
- Tire
- Lubricating oil
- Fixing and maintenance

Truck Operating Cost Calculation Tool

- Main
- Result
- Default Data
- Compute
- Fuel Price



Input Data

1) **Parameters**
   - Carrying weight
   - Fuel price
   - Interest
   - Distance
2) **Company**
   - Fleet size
   - Office staff
   - Office expense
3) **Fleet**
   - Usage life
   - Fuel economy
   - Annual running per vehicle
4) **Staff expense**
   - Office staff
   - Driver
   - Driver assistance
   - Per diem
5) **Vehicle**
   - Cost (chassis & body)
   - Down & Monthly Payment
   - No of payment
   - Salvage value
   - Registration fee
   - Inspection fee
   - Insurance
   - Carrier liability insurance
   - Toll
   - Cross border fee
   - Unaccountable expense
   - Other expense
   - Lubrication expense & rate
   - Vehicle fixing and maintenance
   - Tire expense & rate

Main Screen

- Parameters
- Company
- Fleet
- Staff

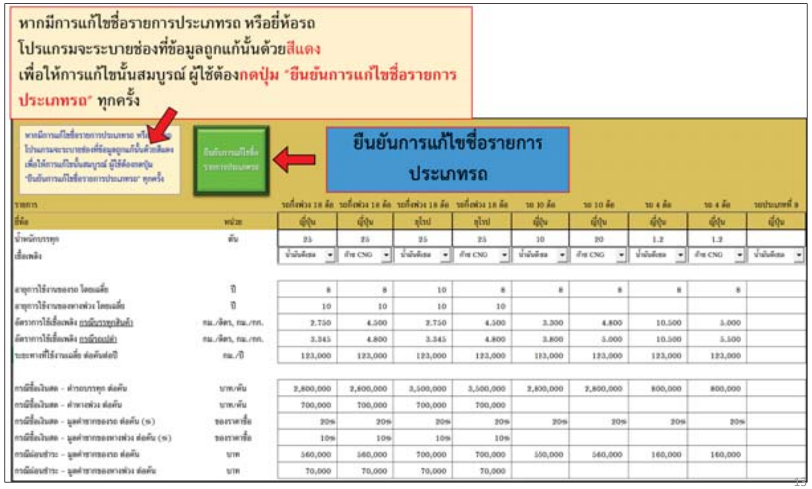
Result


ผลการคำนวณต้นทุนการขนส่งสินค้า

ประเภทรถ: รถกึ่งพ่วง 18 ล้อ ญี่ปุ่น น้ำมันดีเซล

รายการ	ต้นทุน (บาท/กม.)	สัดส่วน	ขาเดียว ต้นทุน (บาท)	ขาเดียว สัดส่วน
ค่ารถและเครื่องมือ	2.33	8.29%	23,304.88	14.78%
ค่าทะเบียน	0.07	0.23%	653.93	0.41%
ค่าตรวจสภาพรถ	0.01	0.05%	141.94	0.09%
ค่าประกันภัย	0.99	3.52%	9,893.53	6.28%
ค่าพนักงานขับรถและผู้ช่วย	8.76	31.22%	43,902.44	27.85%
ค่าเชื้อเพลิง	8.69	30.89%	43,442.95	27.56%
ค่ายาง	1.31	4.66%	6,552.65	4.16%
ค่าน้ำมันหล่อลื่น	0.52	1.85%	2,606.33	1.65%
ค่าซ่อมรถและบำรุงรักษา	0.94	3.35%	4,705.28	2.98%
ค่าผ่านทางพิเศษ	0.27	0.98%	1,372.83	0.87%
ค่าผ่านด่านข้ามแดน	0.74	2.64%	3,712.91	2.36%
ค่าใช้จ่ายไม่มีใบเสร็จ	0.25	0.89%	1,246.53	0.79%
ค่าใช้จ่ายอื่น ๆ	0.00	0.00%	-	0.00%
ค่าใช้จ่ายสำนักงาน	3.22	11.45%	16,097.56	10.21%
รวม	28.13	100.00%	157,633.76	100.00%

Vehicle Database



Calculation Sheet

รายการคำนวณ

ไป-กลับ			
ระยะทาง		10,000	กม.
ต้นทุนคงที่			
ค่ารถต่อปี กรณีเงินสด			
Depreciation			
	รถบรรทุก	280,000.00	บาท/ปี
	หางพ่วง	63,000.00	บาท/ปี
ROI			
	รถบรรทุก	16,800.00	บาท/ปี
	หางพ่วง	3,850.00	บาท/ปี
	รวม	363,650.00	บาท/ปี
ค่ารถต่อปี กรณีเช่าซื้อ			
	รถบรรทุก -	70,000.00	บาท/ปี
	หางพ่วง -	7,000.00	บาท/ปี
	รวม -	77,000.00	บาท/ปี
ค่าใช้จ่ายสำนักงาน			
ค่าจ้างพนักงานสำนักงาน		360,000.00	บาท/ตัน/ปี

รายการ	ต้นทุน/กม	สัดส่วน	ขาเดียว ต้นทุน (บาท)	ขาเดียว สัดส่วน
ค่ารถและเครื่องมือ	2.33	8.29%	23,304.88	14.78%
ค่าทะเบียน	0.07	0.23%	653.93	0.41%
ค่าตรวจสภาพรถ	0.01	0.05%	141.94	0.09%
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ค่าใช้จ่ายสำนักงาน	3.22	11.45%	16,097.56	10.21%
รวม	28.13	100.00%	157,633.76	100.00%

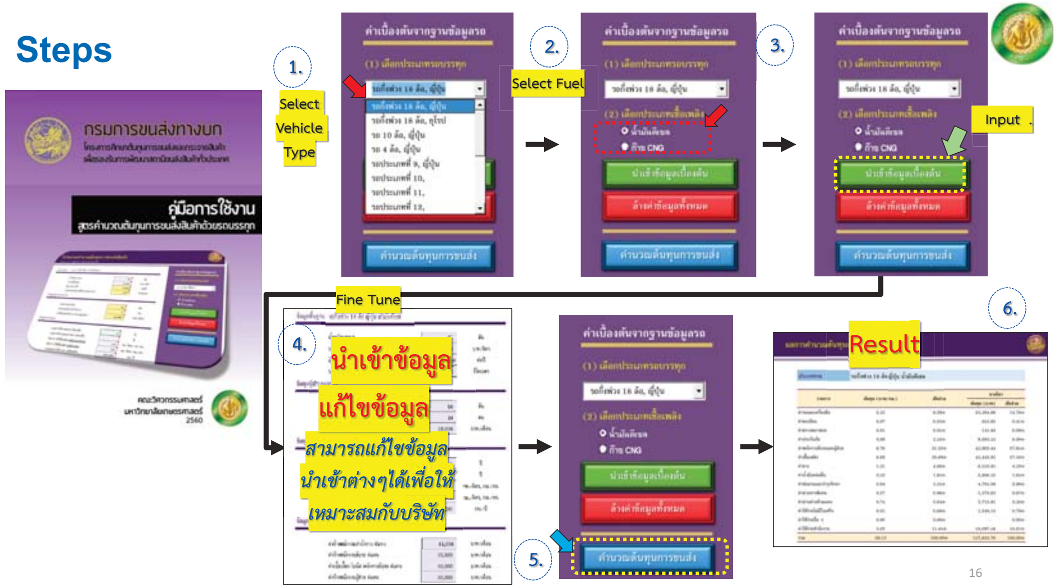
สรุปต้นทุนการขนส่ง (ขาเดียว)	157,633.76	บาท
	31.53	บาท/กม.
	1.26	บาท/ตัน-กม.

Fuel Price

C2 | 23.89

	A	B	C
1		CNG	ดีเซล
2	ราคาต่อหน่วย	13.03	23.89

Steps



Evaluation

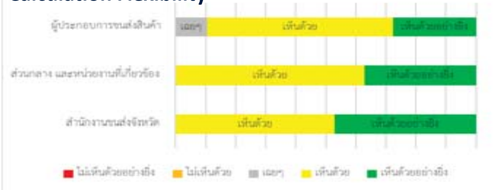




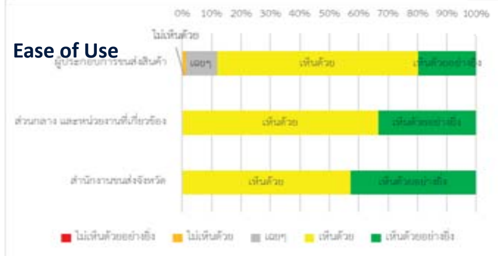
Users' Evaluation

Calculation Concept

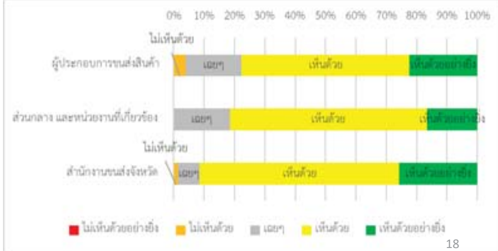
Calculation Flexibility



Ease of Use

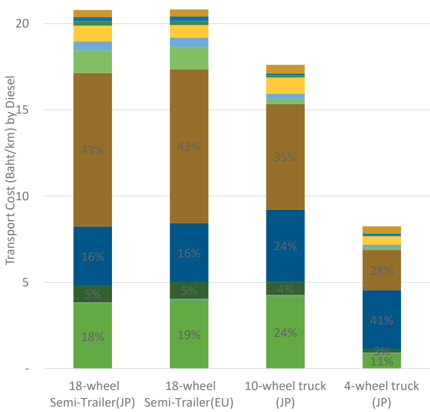


Applicable to your company

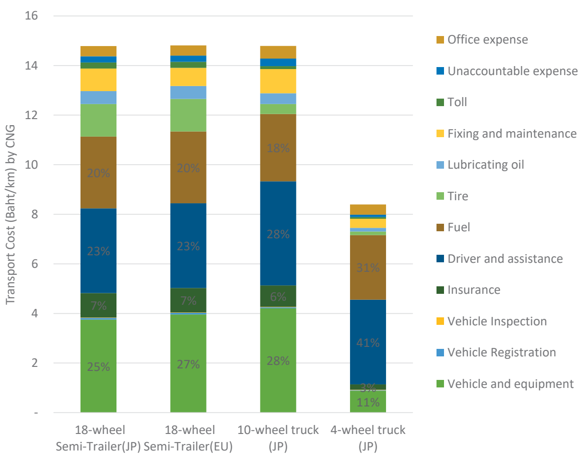


Truck Operating Cost

Diesel truck

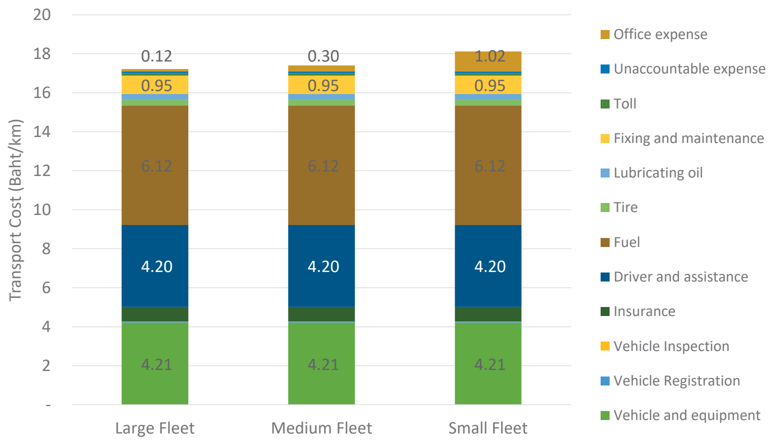


CNG truck



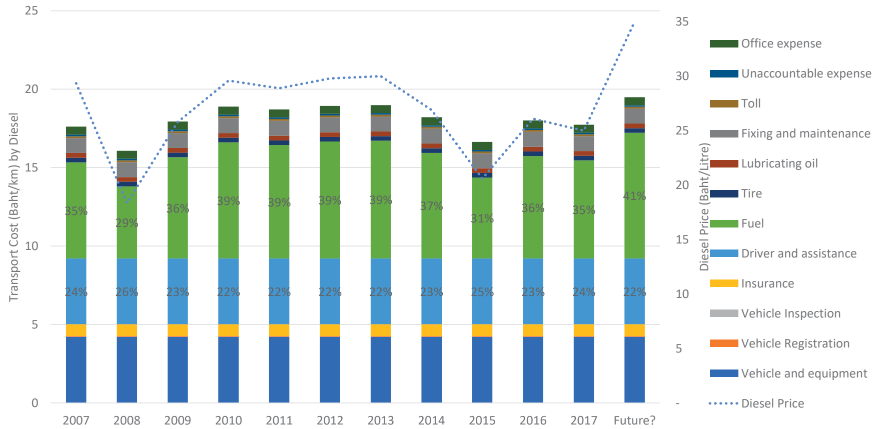
Unit Operating Cost by Fleet Size

*** Case of 10-wheel truck**



Unit Operating Cost by Fuel Price

*** Case of 10-wheel truck**



Third Speaker of <Session 3B>

Col.Dr. Thai Charnkol
Engineering Battalion Commander, Royal Thai Army, Thailand
E-mail: thai.charnkol@gmail.com,

Brief Biography:

Education:

- *Ph.D. (Transportation Engineering) Asian Institute of Technology*
- *M.Eng, (Transportation Engineering) Asian Institute of Technology*
- *B.Eng Civil Engineering (Honors), Chulachomklao Royal Military Academy*

Honors/Awards:

- *Best Academic Awards (Gold medal) from Her Royal Highnesses Princess Maha Chakri Sirindhorn*
- *RTG Scholarships from Royal Thai Government to pursue Doctor and Master degree in Transportation Engineering field of study*

Assignment:

2016-present	*202nd Engineer Battalion Commander, 2nd Development Division, 2nd Army Area*
2014-2016	*Deputy Director, Policy and Plan Division, Directorate of Operations, Royal Thai Army*
2011-2014	*Assistant Professor, Department of Civil Engineering, Chulachomklao Royal Military Academy*
2003-2011	*Lecturer, Department of Civil Engineering, Chulachomklao Royal Military Academy*
2001-2003	*Commander, Cadet Regiment Royal King's Guard, Chulachomklao Royal Military Academy*
1999-2001	*Commander, 3rd Engineering Battalion, 2nd Army Troop, Royal Thai Army*
1997-1999	*Engineer Platoon Leader, 3rd Engineering Battalion, 2nd Army Troop, Royal Thai Army*

International Assignment:

- *United Nations Staff Officer, Joint Logistics Operation, UNAMID, Darfur, SUDAN*

Professional Memberships:

- *The Engineering Institute of Thailand*
- *Professional Engineer, Council of Engineers, Thailand*
- *Thai Society for Transportation and Traffic Studies (TSTS)*
- *Eastern Asia Society for Transportation Studies (EASTS)*

Disaster Management in Thailand
By Col.Dr. Thai Charnkol

Summary:

Fourth Speaker of <Session 3B>

Prof.Dr. Alexis M. Fillone
President of Transportation Science Society of
The Philippines (TSSP)
E-mail: alexis.fillone@dlsu.edu.ph, amfillone@gmail.com

Brief Biography:

Dr. Alexis M. Fillone earned his Master of Engineering (Transportation) at the Asian Institute of Technology (AIT), Bangkok, Thailand and his PhD in Urban and Regional Planning at the School of Urban and Regional Planning (SURP), University of the Philippines, Diliman, Philippines. He is currently the president of the Transportation Science Society of the Philippines (TSSP). He has more than 25 years of experience as a professor in the field of transportation planning and engineering and currently mentors several Master and PhD students. He also has more than 15 years of experience in transport research focusing on travel behavior, urban and regional transportation planning, and traffic impact studies.

Disaster Preparedness and Response in the Philippines: The Case of Earthquakes

By Prof.Dr. Alexis M. Fillone

Summary:

Disaster Preparedness and Response in the Philippines: The Case of Earthquakes

By
Alexis M. Fillone, PhD
Professor, De La Salle University-Manila
President, Transportation Science Society of the Philippines (TSSP)

Summary of Presentation

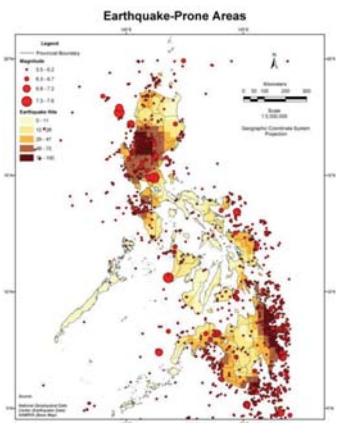
A. Background
- Type of Disasters in the Philippines
- Focusing on Earthquakes

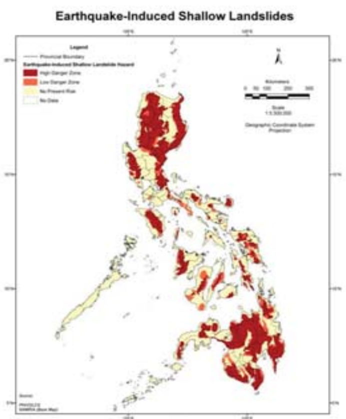
B. The National Disaster Risk Reduction and Management Council (NDRRMC)

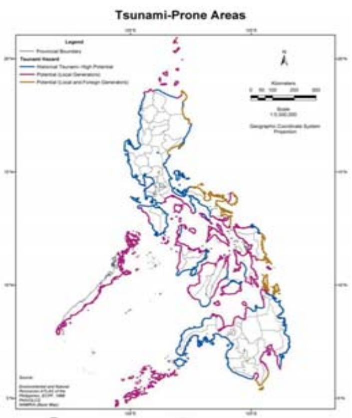
C. Findings

A. Background

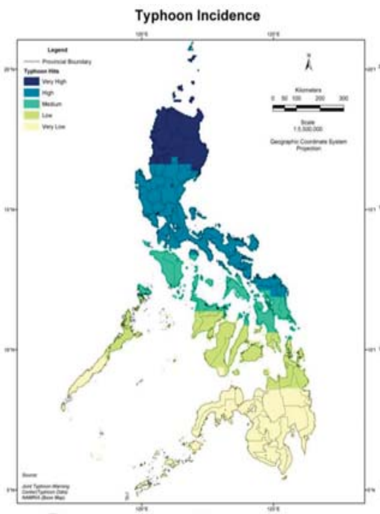
- Type of Disasters in the Philippines

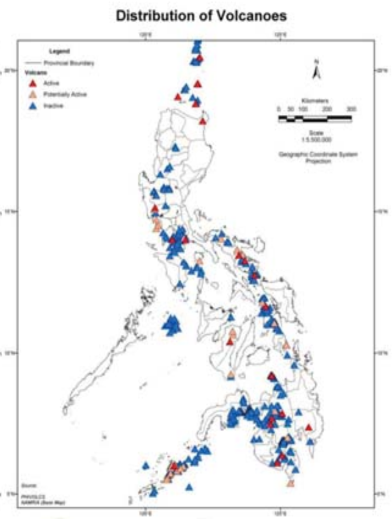


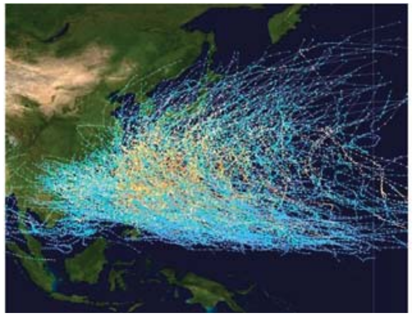




- Type of Disasters in the Philippines

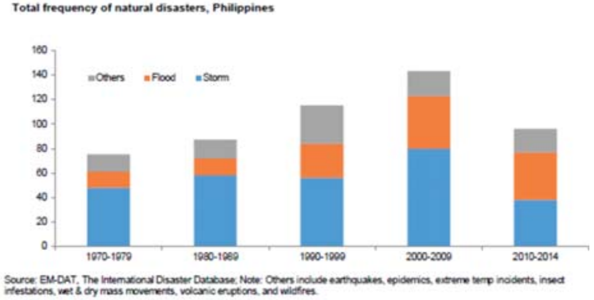




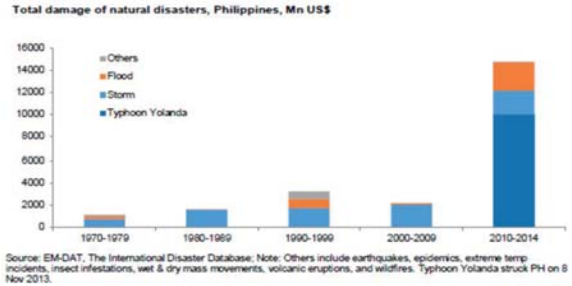


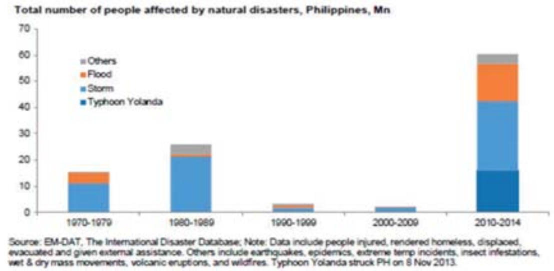
(Pacific Ocean typhoon paths from 1980 through 2005. A new study shows that the destructive power of landfalling typhoons in East and Southeast Asia has increased by nearly 50 percent since 1977. Meanwhile, the number of category 4 and 5 storms striking land has doubled. All impacts due to ocean-surface warming related to human-caused climate change. Image source: Commons.)

https://robertscribbler.com/2016/09/06/new-study-climate-change-has-doubled-the-number-of-category-4-and-5-storms-striking-east-and-southeast-asia/



Source: http://www.investphilippines.info/arangkada/climate/environment-and-natural-disasters/

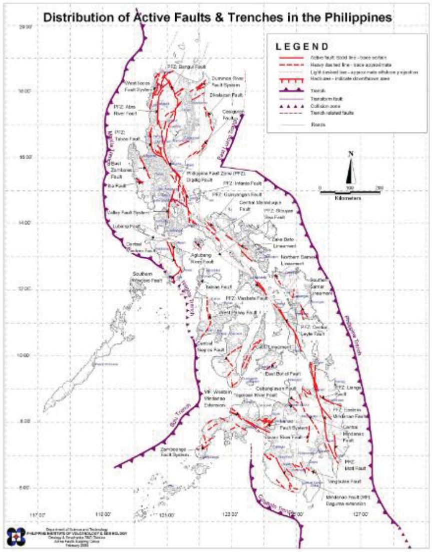




Source: http://www.investphilippines.info/arangkada/climate/environment-and-natural-disasters/

- Focusing on Earthquakes

Major Active Fault Lines in the Philippines
-Marikina Valley Fault
-Western Philippine Fault
-Eastern Philippine Fault
-Southern Mindanao Fault
-Central Philippine Fault



Earthquakes in the Philippines (2013-2017)
Magnitude 5 and above

Location	Magnitude	Date: 2013-Present
Bohol	7.2	October 15, 2013
Zambales	5.9	January 11, 2015
Surigao	6.1	July 3, 2015
Batangas	Earthquake swarm: 5.5 5.6 6.0	April 10-19, 2017
Sarangani	7.2	April 29, 2017
Leyte	6.4	July 6, 2017

Earthquake swarms are events where a local area experiences sequences of many **earthquakes** striking in a relatively short period of time

Bohol Earthquake:

Magnitude: 7.2 (Richter Scale) – strongest in the last 23 years

Date Struck: October 15, 2013

Casualties: 95 deaths (69-Bohol, 15-Cebu, 1–Siquijor)

Type of damage cause: Heavy damage on roads, bridges, and historic churches

Zambales Earthquake:

Magnitude: 5.9 (Richter Scale)

Date Struck: January 11, 2015

Casualties: No casualties

Type of damage cause: Minimal damage to properties

Surigao Earthquake:

Magnitude: 6.1 (Richter Scale)

Date Struck: July 3, 2015

Casualties: No casualties

Type of damage cause: Minimal damage to properties

Batangas Earthquake Swarm:

Magnitude:
-5.6 @ 3:07pm
-5.9 @ 3:09pm

Date Struck: April 10, 2017

Casualties: No casualties

Type of damage cause: Some damage to properties

Sarangani Earthquake:

Magnitude: 7.2 (Richter Scale)

Date Struck: April 29, 2017

Casualties: No casualties

Type of damage cause: Minimal damage to properties

Leyte Island Earthquake:

Magnitude: 6.5 (Richter Scale)

Date Struck: July 6, 2017, 4:03pm

Casualties: No casualties

Type of damage cause: Considerable damage to properties

B. NDRRMC

- The **National Disaster Risk Reduction & Management Council** (**NDRRMC**), formerly known as the **National Disaster Coordinating Council** (NDCC)
- NDRRMC is a working group of various government, non-government, civil sector and private sector organizations of the Government of the Republic of the Philippines established by Republic Act 10121 of 2010.
- It is administered by the Office of Civil Defense under the Department of National Defense.
- The Council is responsible for ensuring the protection and welfare of the people during disasters or emergencies.

- **NDRRMC** plans and leads the guiding activities in the field of communication, warning signals, emergency, transportation, evacuation, rescue, engineering, health and rehabilitation, public education and auxiliary services such as fire fighting and the police in the country.
- The Council utilizes the UN Cluster Approach in disaster management.
- It is the country's focal for the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) and many other related international commitments.

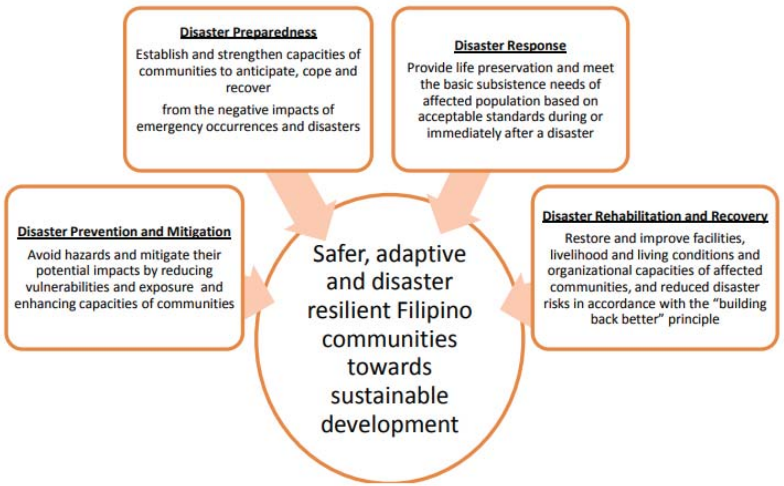
The following heads of agencies compose the NDRRMC:

- **Chairperson** - Secretary of Department of National Defense
- **Vice Chairperson for Disaster Preparedness** - Secretary of Interior and Local Government
- **Vice Chairperson for Disaster Response** - Secretary of Department of Social Welfare and Development
- **Vice Chairperson for Disaster Prevention and Mitigation** - Secretary of the Department of Science and Technology
- **Vice Chairperson for Disaster Rehabilitation and Recovery** - Director-General of the National Economic Development Authority

- **Members:**
  - Secretary of the Department of Health
  - Secretary of the Department of Environment and Natural Resources
  - Secretary of the Department of Agriculture
  - Secretary of the Department of Education
  - Secretary of the Department of Energy
  - Secretary of the Department of Finance
  - Secretary of the Department of Trade and Industry
  - Secretary of the Department of Transportation and Communication
  - Secretary of the Department of Budget and Management
  - Secretary of the Department of Public Works and Highways
  - Secretary of the Department of Foreign Affairs
  - Secretary of the Department of Justice
  - Secretary of the Department of Labor and Employment
  - Secretary of the Department of Tourism
  - The Executive Secretary;
  - Secretary of the Office of the Presidential Adviser on the Peace Process
  - Chairman, Commission on Higher Education
  - Chief of Staff, Armed Forces of the Philippines
  - Chief, Philippine National Police
  - Commandant, Philippine Coast Guard
  - The Press Secretary
  - Secretary-General of the Philippine Red Cross
  - Commissioner of the National Anti-Poverty Commission - Victims of Disasters and Calamities Sector
  - Chairperson, National Commission on the Role of Filipino Women
  - Chairman, Housing and Urban Development Coordinating Council
  - Executive-Director of the Climate Change Office of the Climate Change Commission
  - President, Government Service Insurance System
  - President, Social Security System
  - President, Philippine Health Insurance Corporation;
  - President of the Union of Local Authorities of the Philippines
  - President of the League of Provinces in the Philippines
  - President of the League of Municipalities in the Philippines
  - President of the League of Cities in the Philippines
  - President of the Liga ng Mga Barangay
  - Four representatives from the Civil Sector Organizations
  - One representative from the Private Sector
  - Administrator of the Office of Civil Defense

LOCAL DRRM OFFICES:

- According of Republic Act 10121, various local governments throughout the country should establish Local DRRM Offices at the regional, provincial, municipal, city and barangay levels.
- As functional arms of the local governments, these Offices are responsible to create a Local Disaster Risk Reduction and Management Plan according to the Framework of the NDRRMC covering 4 aspects including disaster preparedness, response, prevention and mitigation, and rehabilitation and recovery.
- Local Offices usually have a Chief DRRM Officer supported by Administrative and Training, Research and Planning, Operations and Warning Officers.
- Some of these Offices have advanced to organizing their own search and rescue and emergency medical services squads and command-control-and-communications centers



NDRRM FRAMEWORK

National Disaster Risk Reduction and Management Plan 2011-2028.

- The NDRRMP sets down the expected outcomes, outputs, key activities, indicators, lead agencies, implementing partners and timelines under each of the four distinct yet mutually reinforcing thematic areas.
- The NDRRMP covers four thematic areas, namely, (1) Disaster Prevention and Mitigation; (2) Disaster Preparedness; (3) Disaster Response; and (4) Disaster Rehabilitation and Recovery, which correspond to the structure of the National Disaster Risk Reduction and Management Council (NDRRMC).
- The goals of each thematic area lead to the attainment of the country's overall DRRM vision, as graphically shown previously

Thematic Area 1: Disaster Prevention and Mitigation

Overall responsible agency: Department of Science and Technology (DOST)

Outcome	Lead agency(ies)
1. DRRM and CCA mainstreamed and integrated in national, sectoral, regional and local development policies, plans and budget	Office of Civil Defense (OCD)
2. DRRM and CCA-sensitive environmental management	Department of Environment and Natural Resources (DENR)
3. Increased resiliency of infrastructure systems	Department of Public Works and Highways (DPWH)
4. Enhanced and effective community-based scientific DRRM and CCA assessment, mapping, analysis and monitoring	OCD
5. Communities access to effective and applicable disaster risk financing and insurance	Department of Finance (DOF)
6. End-to=end monitoring (monitoring and response), forecasting and early warning systems are established and/or improved	Department of Science and Technology (DOST)

Thematic Area 2: Disaster Preparedness

Overall responsible agency: Department of Interior and Local Government (DILG)

Outcome	Lead agency(ies)
7. Increased level of awareness and enhanced capacity of the community to the threats and impacts of all hazards	Philippine Information Agency (PIA)
8. Communities are equipped with necessary skills and capability to cope with the impacts of disasters	Department of Interior and Local Government (to coordinate) and OCD (to implement)
9. Increased DRRM and CCA capacity of Local DRRM Councils,Offices and Operation Centers at all levels	DILG
10. Developed and implemented comprehensive national and local preparedness and response policies, plans, and systems	DILG and OCD
11. Strengthened partnership and coordination among all key players and stakeholders	DILG

Thematic Area 3: Disaster Response

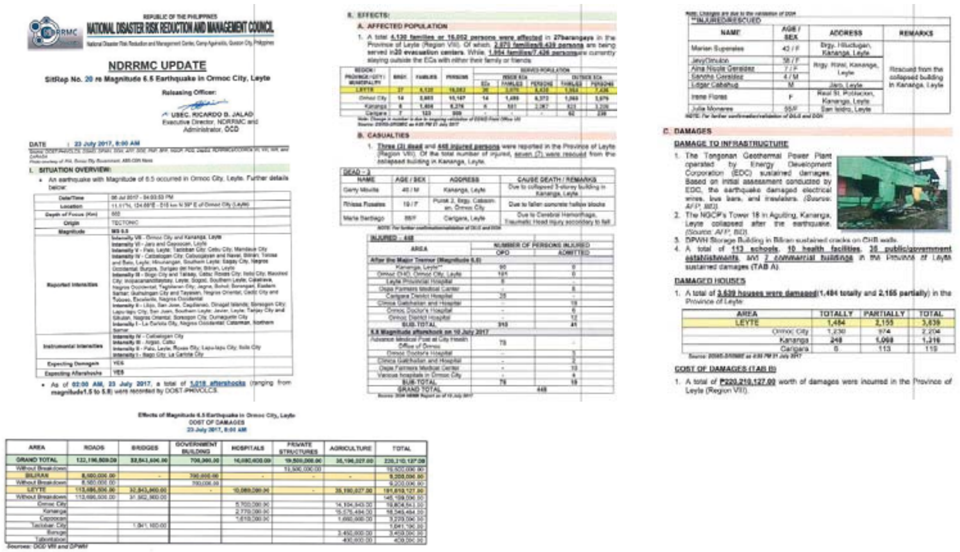
Overall responsible agency: Department of Social Welfare and Development (DSWD)

Outcome	Lead agency(ies)
12. Well-established disaster response operations	Department of Social Welfare and Development (DSWD)
13. Adequate and prompt assessment of needs and damages at all levels	Disaster Risk Reduction and Management Councils (DRRMCs), OCD and DSWD
14. Integrated and coordinated Search, Rescue and Retrieval (SRR) capacity	Department of National Defense (DND), DILG, Department of Health (DOH)
15. Safe and timely evacuation of affected communities	Local government units (LGUs)
16. Temporary shelter needs adequately addressed	DSWD
17. Basic social services provided to affected population (whether inside or outside evacuation centers)	DOH
18. Psychosocial needs of directly and indirectly affected population addressed	DOH
19. Coordinated, integrated system for early recovery implemented	DSWD

Thematic Area 4: Disaster Rehabilitation and Recovery

Overall responsible agency: National Economic and Development Authority (NEDA)

Outcome	Lead agency(ies)
20. Damages, losses and needs assessed	OCD
21. Economic activities restored, and if possible strengthened or expanded	Agency to be determined based on the affected sectors
22. Houses rebuilt or repaired to be more resilient to hazard events; safer sites for housing	National Housing Authority (NHA)
23. Disaster and climate change-resilient infrastructure constructed/reconstructed	DPWH
24. A psychologically sound, safe and secure citizenry that is protected from the effects of disasters is able to restore to normal functioning after each disaster	DOH and DSWD

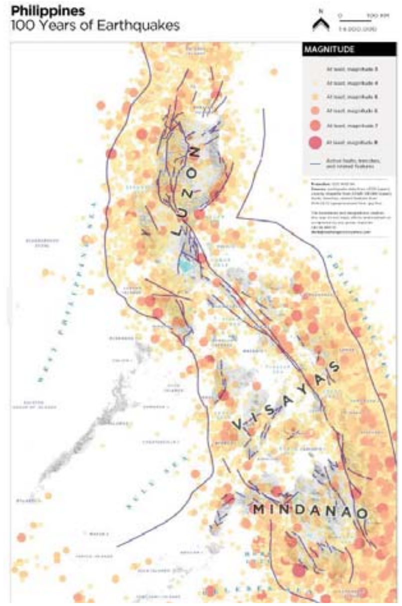


In the Philippines, there are no completely safe and unsafe areas. There are only places of varying risks. We could reduce risk by:

(1)reducing exposure (proper site planning, relocation, etc.);

(2)reducing vulnerability (poverty reduction, sustainable livelihoods, etc.); and

(3)increasing adaptive capacity. Such initiatives will definitely add to the benefits provided by recent activities such as the Metro Manila Shake Drill.



What does it mean for us who are anticipating the Valley Fault earthquake? Operational approaches include:

(1) reducing exposure by following easements based on the fault line;
(2) reducing vulnerability by sustainable urban development, or even by making the maps free, open, and accessible so that more people can be educated; and
(3) increasing adaptive capacity by doing more drills; following good building and construction guidelines; and updating our land use and development plans using risk analyses.

C. Findings

- The establishment of the agency (i.e. NDRRMC) is backed by legislation
- Database system about the impact of the disaster (e.g. earthquake, etc.) is well documented
- Coordination between the local and national governments during the response, recovery and rehabilitation to address the effects of a natural disaster is weak and not in sync
- Long term solution and sustainability of rehabilitation efforts is limited

Fifth Speaker of <Session 3B>

Prof.Dr.Satoru KOBAYAKAWA
Department of Transportation Systems Engineering College of Science & Technology, NIHON UNIVERSITY
E-mail: kobayakawa.satoru@nihon-u.ac.jp

Brief Biography:

EDUCATION

Dr. of Eng. *Nihon University, Transportation Engineering, 2004*
Master of Eng. Mgt. *The George Washington University, Transportation Management (USA), 1994*
Bachelor of Eng. *Nihon University, Transportation Engineering, 1991*

EMPLOYMENT

-Professor (2012-Present)	*Department of Transportation Systems Engineering, College of Science & Technology, Nihon University*
-Associate Professor (2009-2012)	*Department of Transportation Engineering & Socio-Technology, College of Science & Technology, Nihon University*
-Visiting Researcher (2005-2006)	*Institute of Transport Study, Leeds University (UK)*
-Senior Lecturer (2005-2009)	*Department of Transportation Engineering & Socio-Technology, College of Science & Technology, Nihon University*
-Research Associate (1995-2005)	*Department of Transportation Engineering & Socio-Technology, College of Science & Technology, Nihon University*

RESEARCH FIELD

1) Logistics system in urban area
2) Parking management (including parking control, parking planning, parking enforcement and eal)
3) Bike path planning
4) Road traffic safety approach at the local government
5) Urban transportation management for transportation demand management (TDM)

How to Distribute Relief Goods at the Large-scale Earthquake: Learning from Japan Earthquake in 2011-2016

By Prof. Dr. Satoru KOBAYAKAWA

Summary:

Energy-saving navigation (Eco-Navigation) for domestic vessels is an important subject these days. The Eco-Navigation Planning System minimizes fuel consumption by optimal route and speed planning using highly precise weather and oceanographic prediction and ship performance estimation.

Coastal vessels have little choice on route selection, so it is important to select strictly effective courses to achieve FOC reduction. In order to solve this problem, we have developed more highly precise and high-resolution weather and oceanographic prediction than in the past.

The vessel propulsion performance is usually estimated by its line plans and various monitoring data. However, we devised a simplified estimation method only using basic dimensions. Thus, we could reduce the cost and time of implementing this system..

We did many experiments and introduction results for this Eco-Navigation Planning System and we have proved about 4% of FOC reduction effect on average for all vessels. Also, we've done experiments for overseas areas such as Indonesia, Shanghai and Korea, and had almost the same results. It is possible to reduce the greenhouse gas amount of emission in all sailing of domestic vessels using this system, and to employ as a global warming prevention countermeasure as well.

The Marine Bureau in Japan established the "The rating system for domestic vessels" for one of the promotion measures as a maritime environmental protection to save energy. The Global Warming Prevention Headquarters which were determined in the Paris Agreement is behind this provisions. And the reduction target in this scheme is "at least 1.57 million ton reduction of CO2 emissions on coastal shipping by 2030 compared with 2013". Additionally, our Eco-Navigation Planning System is recommended as the system which satisfies the requirement of the tax benefit called "Act on special measures concerning taxation" from April 2017. This can be applied to not only the newly constructed vessels but also the vessels in service. This will encourage seven more promotion of the Eco-Navigation Planning System.

Additionally, shipping companies are putting the emphasis on an energy conservation measure from both sides of hardware and software with the soaring of fuel price in recent years. By using our Eco-Navigation Planning System, it is possible to get the energy saving effect by only selecting the optimum route and shipping companies can reduce navigation cost effectively.

10th ATRANS ANNUAL CONFERENCE
(2017.8.17)

How to Distribute Relief Goods at the Large Scale Earthquake
-Learning from Japan Earthquake in 2011 and 2016-

Satoru KOBAYAKAWA, Dr.
Professor
NIHON UNIVERSITY

Introduction

- Once a large scale earthquake occurred, logistics for relief goods has been important to save the victims' life.
- However, in some case, relief goods could not be delivered to the refuge place.
- Analyze the arrival of relief supplies at disaster area of earthquake in 2011 and 2016.

Reference: NEXCO East Japan Web site

Reference: NEXCO East Japan Web site

Reference: NEXCO East Japan Web site

盛土のり面崩落･路面陥没

Reference: NEXCO West Japan Web site

況

跨道橋の落橋

Reference: NEXCO West Japan Web site

切土のり面土砂崩落

Reference: NEXCO West Japan Web site

Recent Earthquake and Logistics problems in Japan

Name of disaster	Year	Seismic intensity	Fatalities (Injuries)	Logistics Problems
Great Hanshin-Awaji Earthquake	1995	7 (M7.3)	6,434 (43,792)	-Road obstruction by rubbles -Difficulties of relief trucks flowing into disaster area
Niigata-ken-Chuetsu Earthquake	2004	7 (M6.8)	68 (4,805)	-Relief supplies were transported without any coordination by government and private sector
Niigata Earthquake	2007	Upper 6 (M6.8)	15 (2,306)	-Relief supplies from individual were restricted for transport -Lack of man power of unloading and loading at yard in disaster area
Great East Japan Earthquake	2011	7 (M9.0)	15,850 (6.011)	-Deliveries from stockyard to shelter were not working well
Kumamoto Earthquake	2016	7 (M7.3)	225 (2,753)	-Unmatched supplies and demands of goods

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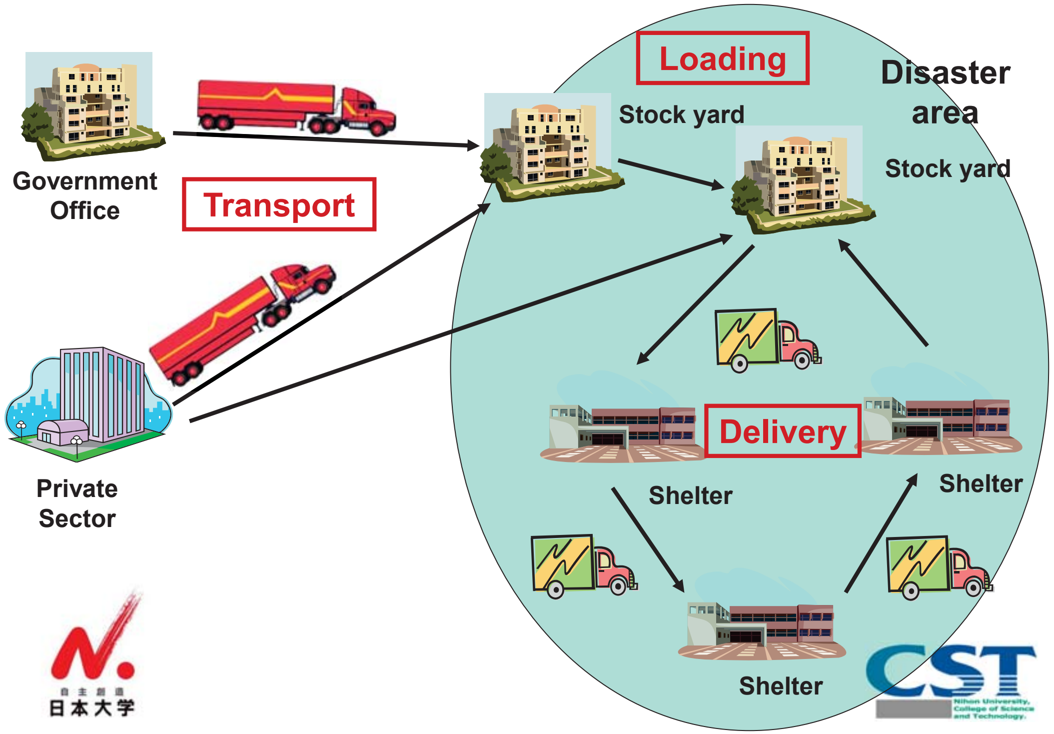

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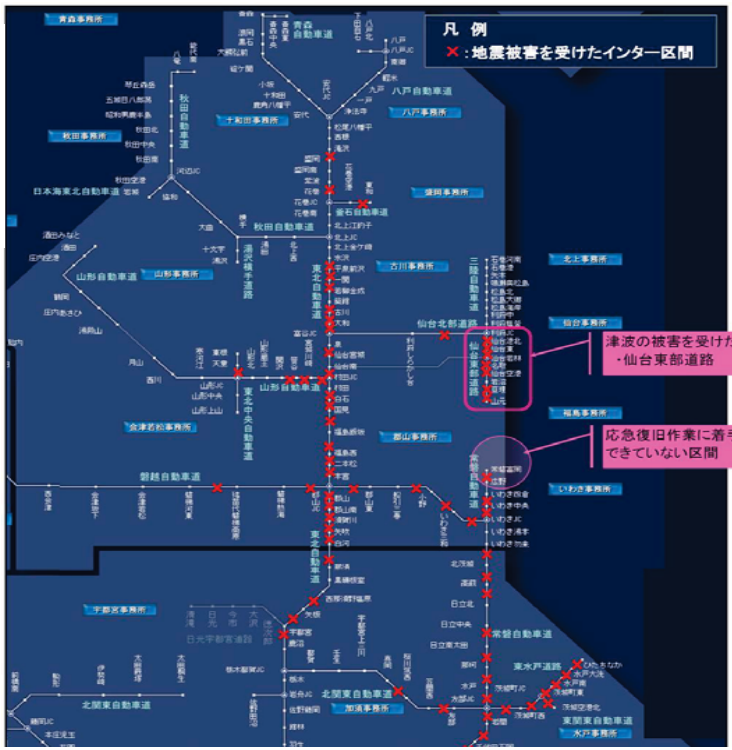
Immediately after disaster occured



Reference: NEXCO East Japan Web site

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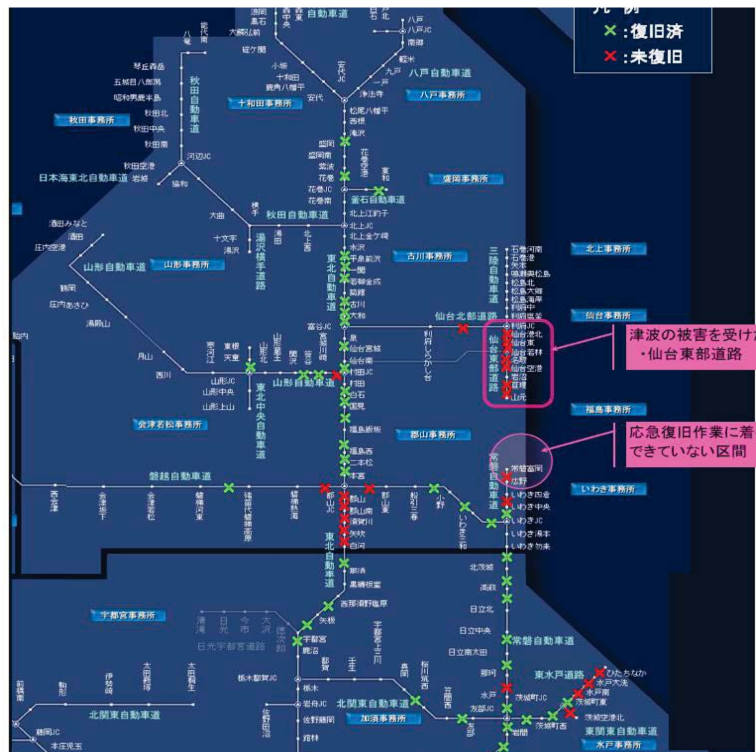
1 week later



Reference: NEXCO East Japan Web site

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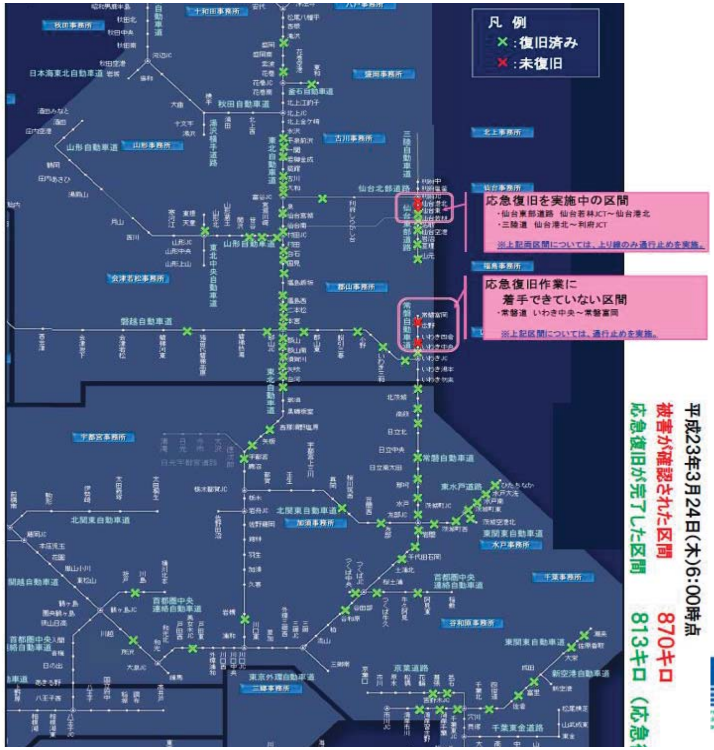
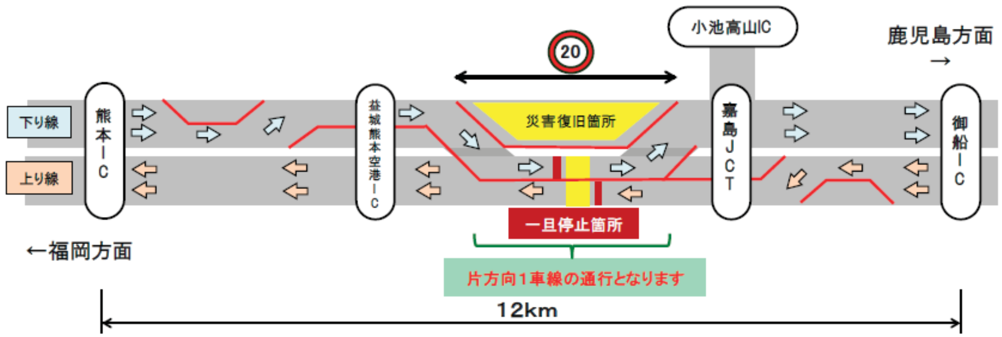
2 weeks later



Reference:
NEXCO
East Japan
Web site



Reference: NEXCO West Japan Web site

Reference: NEXCO East Japan Web site

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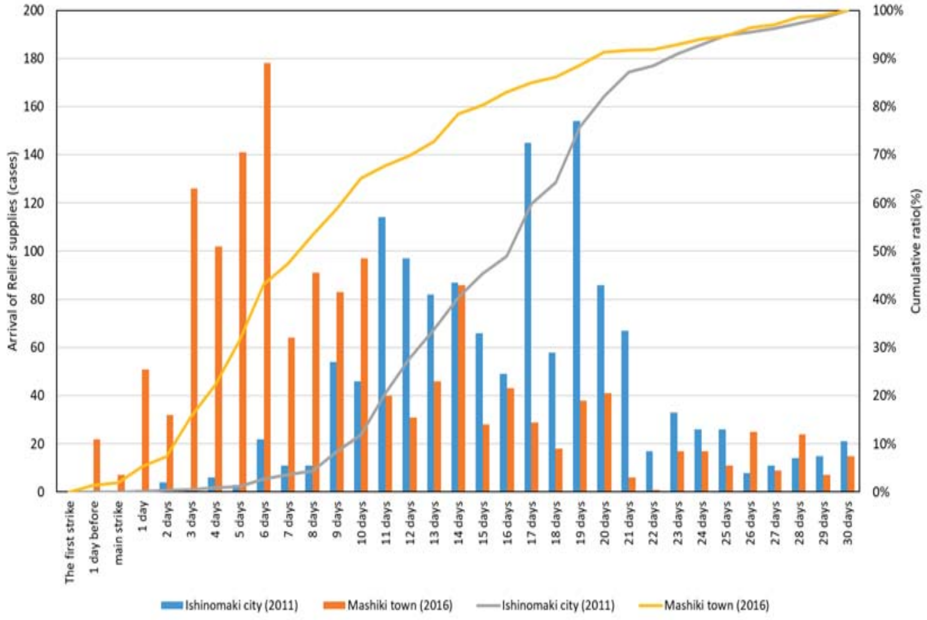
Reference: NEXCO East Japan Web site

Analyzed area

	Ishimomaki city	Mashiki town
Population	160,826 (persons)	33,611 (persons)
Population density	289.4 (person/km2)	511.7 (person/km2)
House holds	57,871 (households)	11,477 (households)
Area	555.78 (km2)	65.68 (km2)
Evacuated persons	50,758 (persons)	16,060 (persons)
Evacuated ratio	31.6%	33.5%

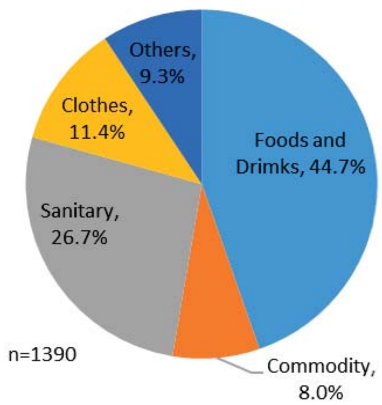
Arrival of Relief Supplies



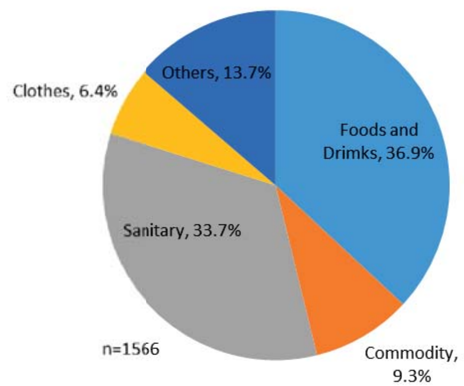
PUSH vs PULL

- Japanese federal government recommended "PUSH" type delivery instead of "PULL" style after East Japan earthquake in 2011.
- PULL type delivery
  - Transport the relief goods based on the information or request from disaster area
- PUSH type delivery
  - Transport the relief goods based on prediction without any request from disaster area

Ratio of Arrival Goods

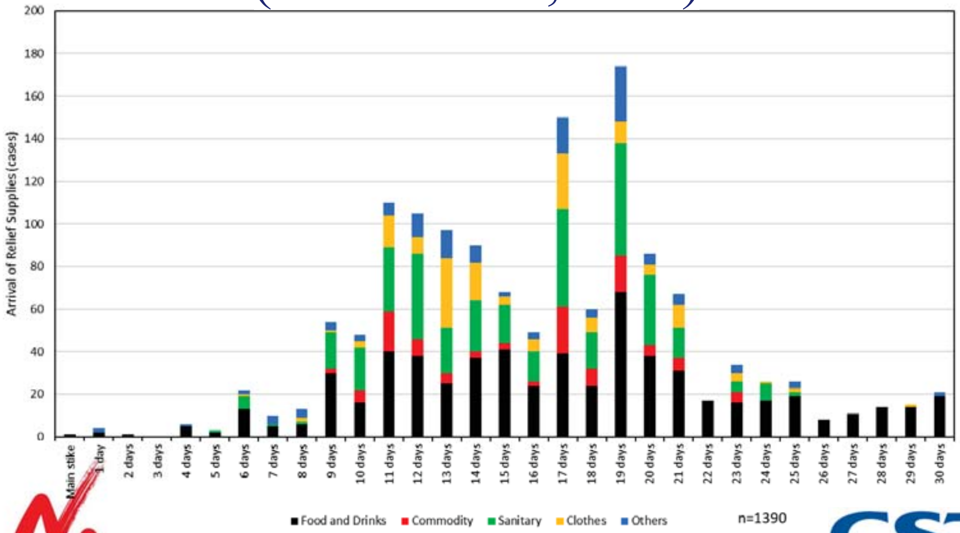


Ishinomaki city
(East Japan EQ2011)

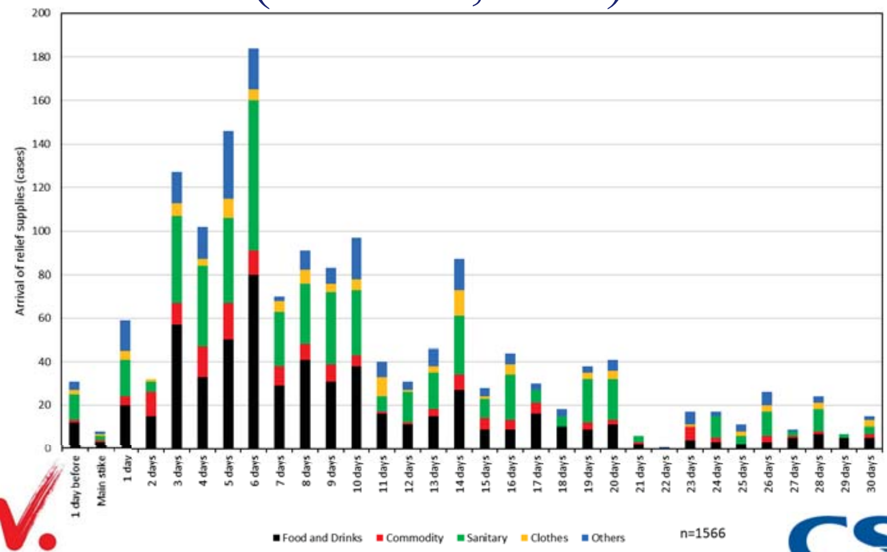


Mashiki town
(Kumamoto EQ2016)

Arrival of Relief Supplies (Ishinomaki,2011)



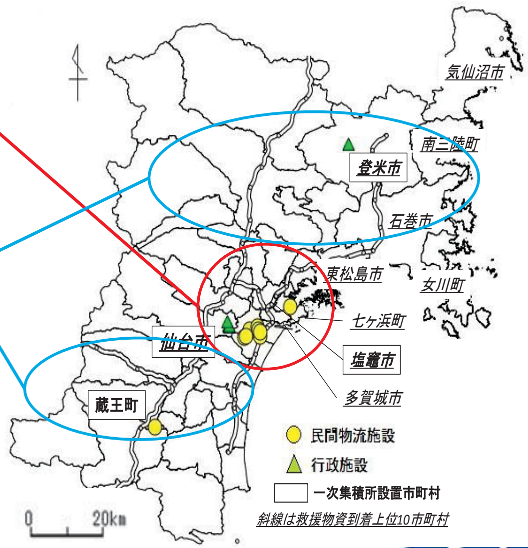
Arrival of Relief Supplies (Mashiki,2016)



Location of Stock yard

12 stock yard were located in CBD

Few stock yard was located other area



The fundamental approach for distribution system of relief supplies

1. Utilize the ability of the logistics company
2. Review of the agreement on Cooperation in case of disasters
3. Securing of information and communication methods
4. Unify the relief supplies ordering form
5. Enforcing prior preparation such as training for evacuation
6. Selecting significant locations of stockyard
7. Designating the logistics company as a public organization on Disaster

The Result of Interview Survey

	Principals	Actual reaction at disaster
1)	Utilize the ability of the logistics company	-Truck association in Kumamoto provided the trucks for a local government -Mashiki town requested the stockyard management to the private logistics company
2)	Review of the agreement on Cooperation in case of disasters	-Agreement with neighborhood government did not work because they were also suffered from disaster
3)	Securing of information and communication methods	-Not deploying extra information and communication system, but using mobile phones to communicate -Application for Smartphone is useful which uses daily life
4)	Unify the relief supplies ordering form	-Not unifying the ordering form -Not necessary for uniformed ordering form
5)	Enforcing prior preparation such as training for evacuation	-Mashiki town did not be trained for evacuation at disaster -Nishihara town trained evacuation for twice per year and also trained how to carry the relief goods
6)	Selecting significant locations of stockyard	-Not selected stockyard -Stockyard have to be changed many times
7)	Designating the logistics company as a public organization on Disaster Countermeasures Basic Act	-Mashiki town had an agreement with logistics company, and they borrowed trucks to deliver the relief supplies -Another town did not have any agreement

Conclution

- There are 3 important points for transport the relief goods; “Transport”, “Loading”, “Delivery”.
- “PUSH” type can deliver the relief goods earlier than “PULL” type but timing is important to reduce the dead stock.
- “The fundamental approach for distribution system of relief supplies” could be useful but it needs the adaption for each local government

< 4th AFTERNOON SESSION >

Session 3: Parallel Session of Main Annual Conference (Symposium)

Session 3C: Transportation-related, Energy & Environment
Moderated by Dr.Nuwong Chollacoop, MTEC, Ministry of Science and Technology, Thailand
Financing Sustainable Urban Transport By Mr. Frederik Strompen Advisor, Transport and Climate Change, GIZ
Impact Assessment of a Wildlife Corridor on a Human Populated Area By Dr. Win TRIVITAYANURAK, Department of Highway, Ministry of Transport, Thailand
ASEAN Fuel Economy Platform By Mr. Tali Trigg Project Director of Energy Efficiency and Climate Change Mitigation in the Land Transport Sector in the ASEAN Region, GIZ
Electric Vehicle Charging Station Promotion in Thailand By Asst. Prof. Dr. Amornrat Kaewpradap, Department of Mechanical Engineering, Faculty of Engineering, King Mongkut's University of Technology Thonburi (KMUTT), Thailand

Moderator of <Session 3C>

Dr.Nuwong Chollacoop
MTEC, Ministry of Science and Technology
E-mail: nuwongc@gmail.com

Brief Biography:

Education:

Degree title	*Bachelor of Science, with Honors and Magna cum Laude (Sep 1995 – May 1999)*
Subject	*Engineering with Economics minor (GPA of 4.0/4.0)*
Institution	*Brown University (Providence, RI, USA)*
Degree title	*Doctorate of Philosophy (Sep 1999 – Jan 2004)*
Subject	*Materials Engineering with Bio-Engineering minor (Cumulative GPA of 4.9/5.0)*
Institution	*Massachusetts Institute of Technology (Cambridge, MA, USA)*

Awards:

Sep 2009 *Green Talents 2009: The International Forum for High Potentials in Green Technologies by*
Federal Ministry of Education and Research (BMBF), Germany
15 Green Talents 2009 were selected by renowned German scientists from 156 young researchers who applied from 43 different countries (http://www.greentalents.de/)

Experiences:

Aug 2004-present:	*National Metal and Materials Technology Center (MTEC), THAILAND*
Nov-Dec 2011:	*Graduate School of Environment and Energy Engineering, Waseda University, JAPAN*
Jun-Aug 2010:	*Institute for Combustion Engines (VKA), RWTH-Aachen University, Germany*
Nov-Dec 2009:	*National Institute of Advanced Industrial Science and Technology (AIST), JAPAN*
Nov 2008-present:	*Economic Research Institute for ASEAN and East Asia (ERIA)*
Jan 2007:	*National Institute of Advanced Industrial Science and Technology (AIST), JAPAN*

First Speaker of <Session 3C>

Mr. Frederik Strompen
Advisor, Transport and Climate Change, GIZ
E-mail: frederik.strompen@giz.de

Brief Biography:

Frederik is a Technical Advisor in the project "TRANSfer – Towards Climate-Friendly Transport Technologies and Measures" in the Energy, Transport and Water Division of GIZ headquarters in Bonn, Germany. His main topics and areas of expertise are climate change policy, economic instruments and transport policy. In his current work he focusses on the development of climate change mitigation projects in the field of urban transport and green logistics. Before that, he worked on electro-mobility related projects in China. Frederik holds a Master degree in Environmental Economics from the University of London.

Financing Sustainable Urban Transport
By Mr. Frederik STROMPEN

Summary:

Financing sustainable urban transport – A comparative analysis of approaches to national urban mobility policies

Cities around the world are facing increasing environmental, social and economic challenges caused by inefficient urban transport systems. The economic growth of the last decades has been accompanied by a rapid motorization, increases in car ownership and travel. In many countries in Asia it is not uncommon that vehicle ownership rates grow by 15-20% per annum with obvious implications on urban sprawl, increasing travel times and negative externalities associated especially with private cars (congestion, pollution etc.). Road congestion alone is estimated to cost Asian economies 2-5% of their annual GDP (ADB, 2013). Currently cities account for about 40% of the energy used in transport with a clear trend towards growth (IEA, 2013). The urbanisation in developing and emerging countries is a key driver behind this trend. Cities in these regions will grow from two to four billion people (UN DESA, 2011). In 2020, 50% of the Asian population will be living in urban areas (AFD, 2014).

Considering the life span of urban structure and urban transport infrastructure, the type of urban growth that cities will pursue in the next three decades will determine the liveability of these cities, their economic condition their energy consumption and their contribution to global warming. As the number and size of cities are growing, cities are increasingly facing challenges to develop high-quality infrastructure and operations for all modes, especially sustainable modes such as walking, cycling and public transport.

A key challenge is to shift the current pattern of investments towards more sustainable transport. National urban transport policies are an opportunity for central governments to support cities financially and technically in the planning and implementation of sustainable transport systems. However, this requires a true paradigm shift considering the systemic bias towards unsustainable modes, the chronic underfunding of public transport and skewed prices for motorised individual mobility. The barriers to shift towards sustainable urban transport systems are often of very practical nature and highly depend on the local situation.

1) Institutional barriers: Institutional complexity and lack of coordination especially between national and local governments are key limitation for effective planning, design, construction and maintenance of sustainable urban transport systems. Private operations of public transport services are often either lacking market access at all or exist without adequate regulation.

2) Financial barriers: Public transport has a public good character. Usually neither investments nor operations can sufficiently be covered by fare box revenue. Consequently, other revenue streams need to be generated and dedicated funding needs to be provided for

investments and operations of public transport. Funding for public transport operations is often not linked to performance evaluation.

3) Planning framework: Local public transport or mobility plans need to be a mandatory element of city planning and a precondition for funding. Often planning overemphasizes physical features of urban transport network and lacks a user perspective. Transport impact evaluation becomes a formality under the pressure of rapid commercial and residential development.

To overcome these barriers many countries have employed a mixture of decentralised and centralised funding programmes. This presentation will elaborate on the current barriers for sustainable transport financing and introduce two models for funding sustainable urban transport.

National Urban Mobility Programmes

–

Financing, Institutions and Rules for Urban Transport

Frederik Strompen
Project Manager Sustainable Transport

Bangkok, 18 August 2017

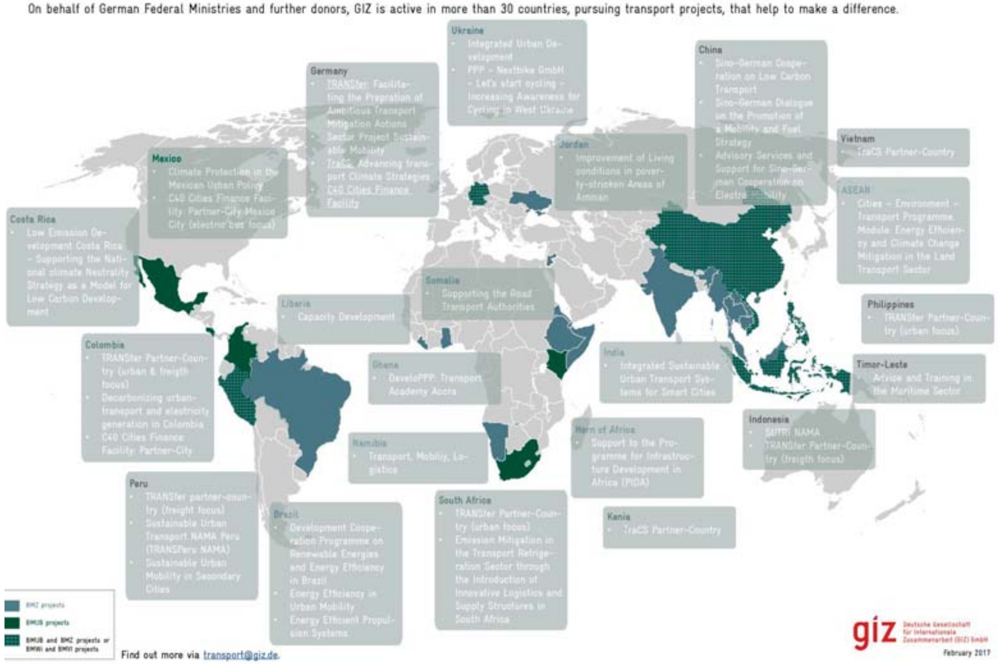
Asian Transport Research Society - Annual Conference on Transportation

GIZ worldwide

- GIZ's purpose is to promote international cooperation for sustainable development.
- GIZ is a 100% federally owned, public-benefit enterprise.
- GIZ operates in more than 130 countries worldwide with an annual turnover of approx. 2 billion EUR (in 2011)
- GIZ employs approximately 17,000 staff members worldwide
- GIZ is active in a variety of sectors, including e.g. education; health care; agriculture; Infrastructure (water, energy, transport)

GIZ Transport Projects

On behalf of German Federal Ministries and further donors, GIZ is active in more than 30 countries, pursuing transport projects, that help to make a difference.



Find out more via transport@giz.de.

February 2017

TRANSfer Project – Towards climate-friendly transport technologies & measures

- **Objective:** Reduce GHG emissions and harness local benefits with transport mitigation actions in developing countries.
- **Budget:** €15 Mio (by BMUB in 2010-2020); further donors foreseen
- **Preparation Facility** for Transport Mitigation Actions to support INDC implementation
- **Partner countries:** Colombia, Peru, Philippines, Indonesia, South Africa; upcoming: Thailand; formerly: China

Track record since 2010…

- ✓ first transport NAMAs at implementation stage
- ✓ Substantial financial resources mobilised
- ✓ Timeframe for NAMA development ~ 2 years
- ✓ Internationally recognized instruments and tools

We love to move, travel, discover…
in different ways and by various modes…

In most cities, mobility is dominated by personal motorized transport.
Many people choose cars to move around…

Road transport is a major contributor to air pollution and climate change.
Transport contributes to 23% of energy-related CO_2 emissions and is still growing!

Worldwide, 1.3 Million road deaths and up to 50 Million people injured per year

10-25% of urban areas are taken by road transportation infrastructure -
A lot of space for cars but…

…where is the space for people?
the silent pedestrian, the invisible cyclist must be seen… and heard

What are the solutions?

		Avoid –		Shift – Improve –		Fuel Switch
total emissions	=	**transport demand** [passenger-km]	x	**energy intensity** [joule per pkm]	x	**CO_2 intensity** [CO_{2e} per joule]
approaches						

If we know the solutions and have the tools: **Why is it so difficult to shift towards sustainable transport?**

Status Quo in many parts of the world

- Weak or non-existing regulations for integrated urban mobility planning, limited guidance on state-of-the-art planning processes

→ infrastructure-oriented transport planning vs. mobility behaviour and needs

- Limited guidance for designing safe and convenient walkways, cycling infrastructure and public transport integration

→ Outdated road building norms favour high speeds of motorised transport

- Uncoordinated funding mechanisms due to incoherent national urban transport policies

→ Lack of priority-setting for sustainable urban transport measures

Planning instruments

„If you plan for cars and traffic, you get cars and traffic.“

„If you plan for people and places, you get people and places.“

Traditional Transport Planning	⇔	Sustainable Urban Mobility Planning
Focus on traffic	⇔	Focus on people
Primary objective: Traffic flow capacity and speed	⇔	Primary objectives: Accessibility and quality of life
Political mandates and planning by experts	⇔	Important stakeholders are actively involved
Domain of traffic engineers	⇔	Interdisciplinary planning
Infrastructure as the main topic	⇔	Combination of infrastructure, market, services, information, and promotion
Investment-guided planning	⇔	Cost efficient achievement of goals
Focus on large and costly projects	⇔	Gradual efficiency increase and optimisation
Limited impact assessment	⇔	Intensive evaluation of impacts and shaping of a learning process

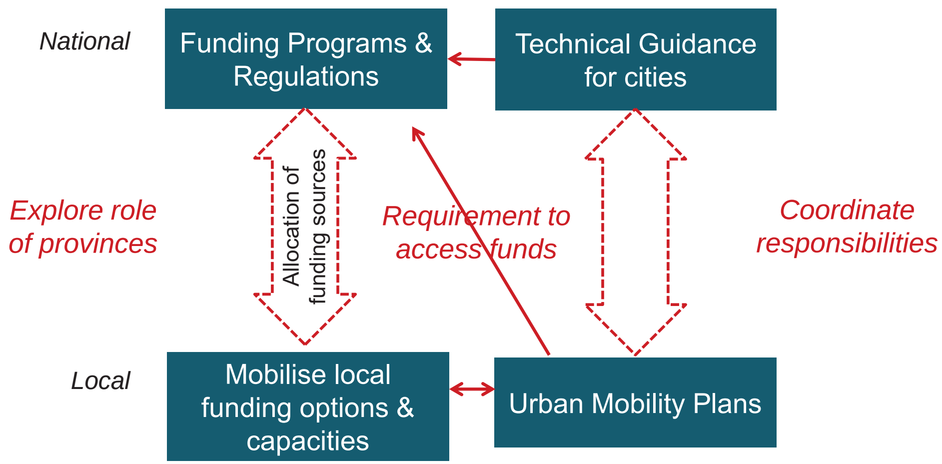
Source: Rupprecht Consult, quotations by Fred Kent, President of „Project for Public Space“: www.pps.org

Towards Sustainable Financing

- A country's **sustainable development, climate & energy goals**
- The country's **transport policy & strategy**
- **Institutions and a legal framework** supporting these goals
- **Transport taxation and charging policies** (Where the money comes from?)
- **Appropriate spending** - based on standardized evaluation criteria, urban mobility plans (Where the money goes?)

Contraproductive counter measures, such as funding for private transport through cheap loans for buying vehicles, too low fuel taxes or even fuel subsidies, etc. should be avoided!

National Urban Mobility Programme/Policy



NUMP: National Guidance for Urban Mobility Planning

✓ **Planning regulations and guidelines**

… supporting **integrated mobility and land-use planning** (at local and regional level) with priority for sustainable transport

… supporting the elaboration and application of **high quality/service standards** for transport infrastructures and services

… facilitating stakeholder and civic **participation**

✓ **Regulatory framework conditions**

… suitable to **direct (private and public) investment** towards quality public transport systems and vehicles

… **enabling cities to implement** parking policies, ticketing systems, ITS, etc.

+ Capacity Building for local planners and decision-makers

Design options for NUMPS

Centralised System

Technical and financial control

National Government
Focused programme with technical requirements, e.g. MRT

State or municipal governments

Mass transit project
(BRT/ LRT/ Suburban trains)

Decentralised System

National Government
Urban transport fund

Technical and financial control

State or municipal governments

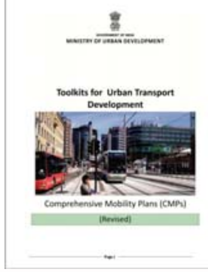
Many different transport projects based on local needs

INDIA – Comprehensive Mobility Plans

*"A CMP presents a **long-term vision of desirable mobility patterns** (people and goods) for a city and provides strategy and policy measures to achieve this vision.*

*It follows the **guidelines set forth by National Urban transport Plan** which emphasizes on **NMT measures, PT systems and sustainable systems**"*

- National Urban Transport Policy:
  - Comprehensive process description
  - funding program
  - national guidance
- Toolkits (Guidelines) revised in 2013 (to be ratified)



Source: CMP Preparation Toolkit - Guidelines and Toolkits for Urban Transport Development in Medium Sized Cities in India – MoUD/ADB

Indonesia`s Sustainable Urban Transport Program

National Level
- National program to support transport planning & financing

Technical Support Unit (TSU)

Effective Funding mechanism to co-finance infrastructure

Capacity Development & Consultancy

Investment support based on competition

Pilot Cities
- Implementation;
- Monitoring & Reporting

Mitigation actions
- Public Transport system improvements
- Investment in energy efficient buses
- Investment in bus infrastructure
- Integrated planning

Germany's National Urban Transport Policy

NATIONAL
- Provides funds (e.g. from fuel taxes) to provinces for specific programmes and projects
- Defines criteria such as cost-benefit analysis, environmental impact assessment, etc.
- Regulates market access of transport operators and minimum standards

PROVINCIAL
- Require comprehensive mobility plans from cities
- Provide funds to Cities and identify projects
- Fund regional railways such as S-Bahn (tendering services)
- Initiates *Regional Transport Associations* (Verkehrsverbund)

MUNICIPAL
- Plan and finance infrastructure projects (with support from provinces)
- Tender public transport services and define quality criteria in service contracts
- Subsidies local transport operators
- Issue special tickets to students and senior citizens

Lessons learned

- Reliable national funding is needed to foster urban sustainable transport
- National urban transport policies and funding have been essential in creating comprehensive public transport systems in many countries
- No one size fits all – funding schemes evolve as capacities grow
- Capacity development for comprehensive mobility planning is required
- The maintenance trap
- Tap additional revenues for sustainable urban transport in parallel to national funding schemes: TDM, land value capture und reduction of fuel subsidies
- Explore NAMAs to foster national urban transport policies and financing mechanisms

Thank you!

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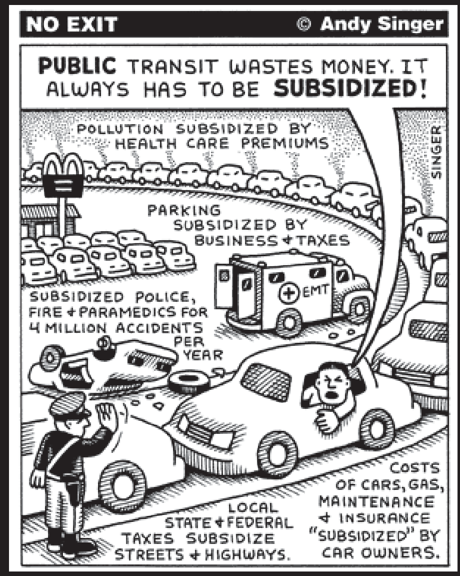
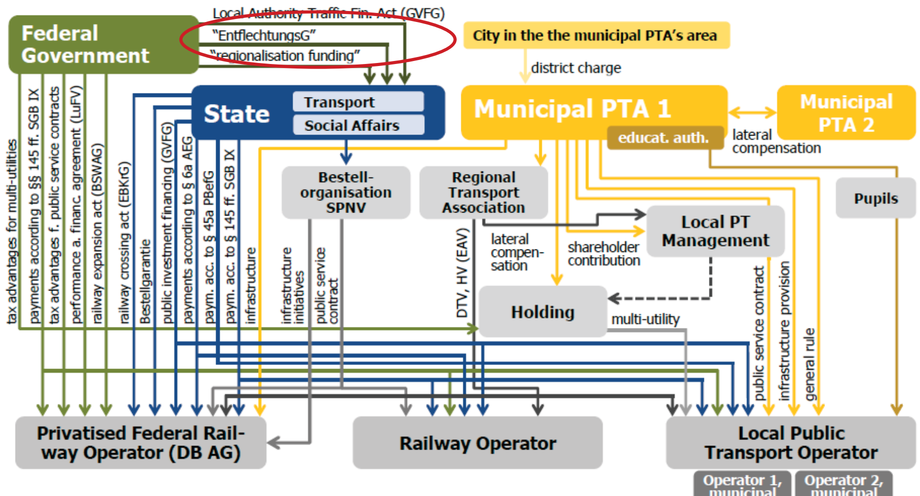
www.giz.de/transport



09/08/2017

Back up

Financing systems evolve…



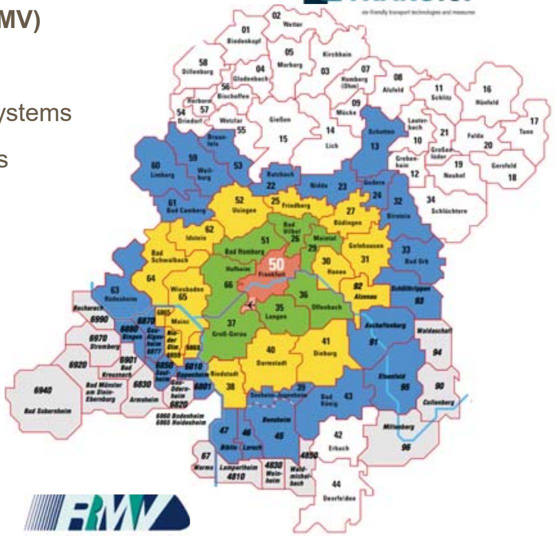
Simplified and abstracted illustration of the PT funding practices in one single area
Source: KCW

City of Frankfurt (Main)

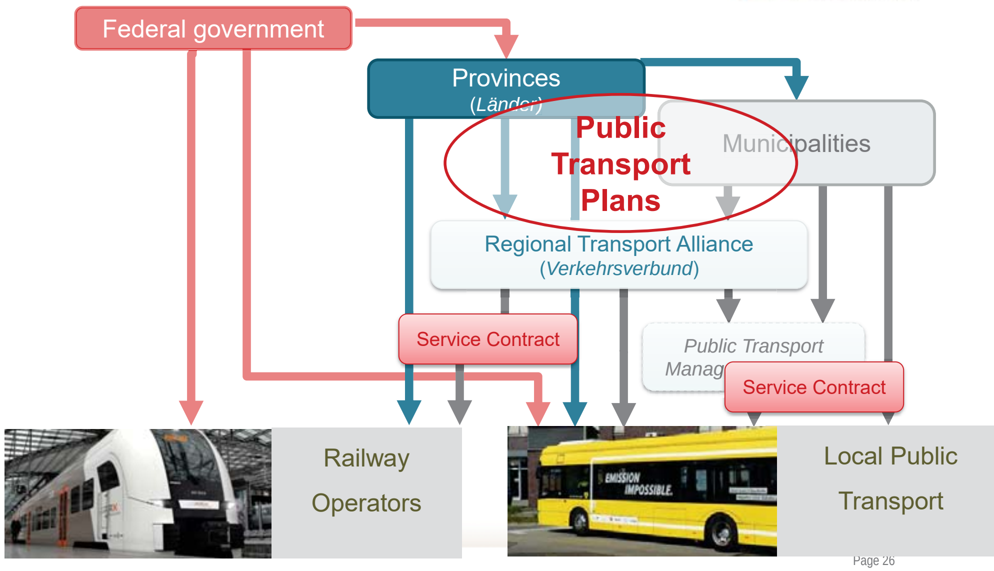
Example

Rhine-Main Transport Alliance (RMV)

- Started in 1995
- Integration of 112 different fare systems
- Managing 153 transport operators
- Board includes
  - 15 rural districts
  - 4 large cities (e.g. Frankfurt)
  - 7 medium-sized towns
  - Provincial government (Hessen)
- Tendering rail services
- Joint marketing
- Integrated timetable/interchange

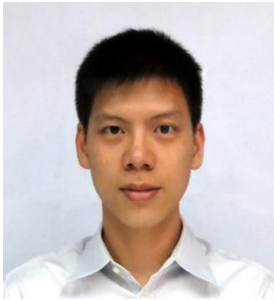


Rhein-Main-Verkehrsverbund



Second Speaker of <Session 3C>

Dr. Win TRIVITAYANURAK
Department of Highway,
Ministry of Transport, Thailand
E-mail: win.trivitayanurak@gmail.com



Brief Biography:

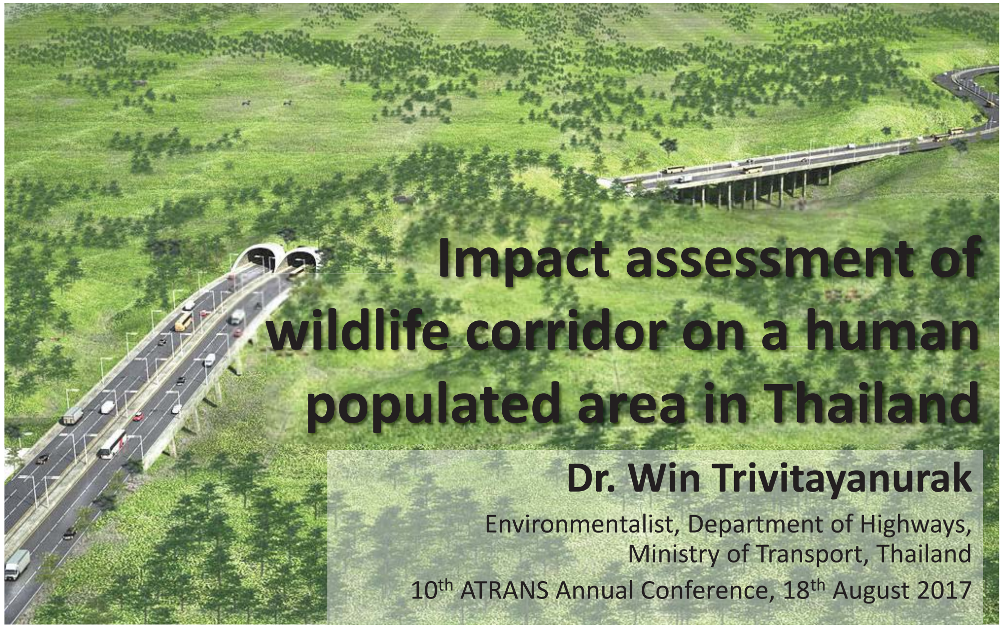
Background in Environmental engineering, Bachelor degree - Ph.D.
After graduated from Faculty of Engineering, Chulalongkorn Univ. in 2000, I spent a few years in the private sector in environmental and renewable energy firm then I was awarded with Royal Thai Scholarship for post-graduate study in USA. My thesis focused on development of global atmospheric model. After Master-Ph.D. at Carnegie Mellon Univ., Pittsburgh, Pennsylvania, I continued for a post-doctoral position at University of Edinburgh, Scotland. Upon returning to Thailand and began working at Department of Highways since 2010 as an environmentalist, I managed environmental impact assessment, environmental monitoring, and public participation as well as pursuing new areas such as social responsibility, carbon footprint, and ecological corridor, working toward sustainable highway development.

Impact Assessment of a Wildlife Corridor on a Human Populated Area

By Dr. Win TRIVITAYANURAK

Summary:

The Department of Highways conducts a study on wildlife corridor development on National Hihgway 317 (NH317) in Chantaburi Province. The study area is located between km. 27 and km.30+250 situating between wildlife sanctuary areas. About 2 kilometers to the east of the NH317 lies the Khlong Kruewai Chalearm Phrakiat Wildlife Sanctuary (Patch 1) and around 500 meters to the west of the NH317 situates the Khlong Kruewai Chalearm Phrakiat Wildlife Sanctuary (Patch 3). Khao Soi Dao Wildlife Sanctuary is located approx. 4 kilometers away in northwest direction. The potential wildlife corridor was included in the high-priority recommended site from a country-wide feasibility study on ecological corridors for major forest groups by the Department of National Parks, Wildlife and Plant Conservation (DNP). The area is frequented by elephants causing occasional conflicts with the locals for damaged commercial produce, trees, and some properties. The study proposed wildlife corridor design along with elephant guide fences encapsulating the wildlife corridor area for free movement of animals and other wild animals in the area between the two wildlife sanctuaries. Apart from the potential benefit for habitat enhancement, there are potential impacts for local residents living and working in the area designated as a wildlife corridor. Key impacts are on the locals in the wildlife corridor due to increase risk of animal encounter and damages to fruits, properties, and personal wellbeing. Impacts can also include stress, limited of access, and possibly relocation. Proposed mitigation includes warning systems, a new compensation scheme, training and education. Provision of access gates and points are also proposed as mitigation. Compensation for relocation could be a complicated issue due to legal compliance with the laws. Another major stakeholder who will be affected is the wildlife sanctuary staff who will be responsible for the new wildlife monitoring work, anti-poaching work, assistance for safe human-elephants coexistence in the area, management of animal food source, and possibly guiding elephants into the wildlife corridor. There shall be appropriate allocation of budget, human resources, and training/ knowledge transfer. It is uncertain if or when this project will be implemented. There will have to be further study and survey to finalize the animal guide fences alignment if the project is to be materialized. Future of greener highway network that coexists with ecological network relies on shared vision between Ministry of Transport and Ministry of Natural Resource and Environment and tighter collaboration in decision making and development.



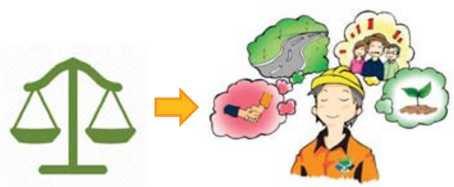
Impact assessment of wildlife corridor on a human populated area in Thailand

Dr. Win Trivitayanurak
Environmentalist, Department of Highways, Ministry of Transport, Thailand
10th ATRANS Annual Conference, 18th August 2017

- Accompanying paper in the 10th ATRANS (Symposium) Annual Conference: Young Researcher's Forum 2017 Proceeding
- Co-authors: Laddawan LEELACHAI, Taweesak POYAROT, and Wichian KONGTONG

Introducing DOH's **Office of Environment and Public Involvement**

- Environmental safeguarding:
  - Impact assessment
  - Monitoring
- Public involvement throughout development cycle



Effects of habitat fragmentation

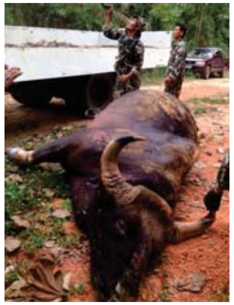
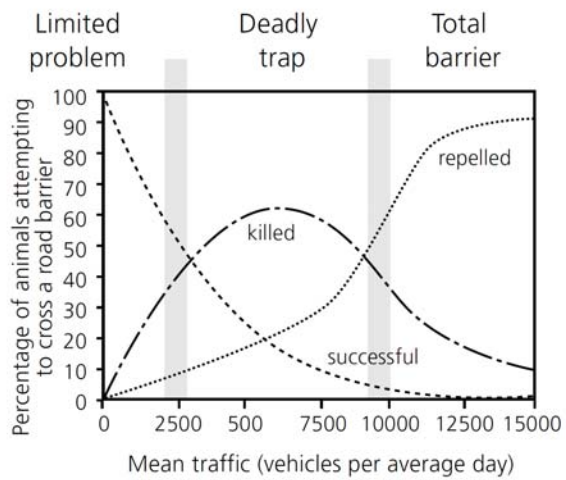


Photo: http://www.manager.co.th/local/viewnews.aspx?NewsID=9580000075915

Photo: https://www.khaosod.co.th/breaking-news/news_28372

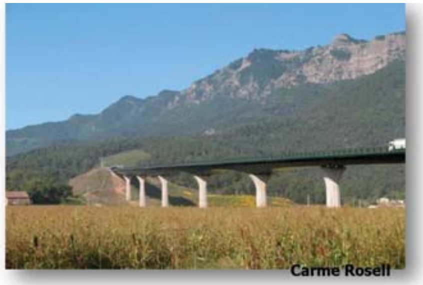


Source: COST 341 Habitat Fragmentation due to Transportation Infrastructure
WILDLIFE AND TRAFFIC
A European Handbook for Identifying Conflicts and Designing Solutions

Types of wildlife crossing structures

- Viaducts
- Tunnels

Viaducts and tunnels



Credit: Elke Hahn, Member of the IENE Steering Committee/ Ministry for Transport, Innovation and Technology of Austria

Fauna passages - Overpasses

Credit: Elke Hahn, Member of the IENE Steering Committee/ Ministry for Transport, Innovation and Technology of Austria

Fauna passages - Underpasses

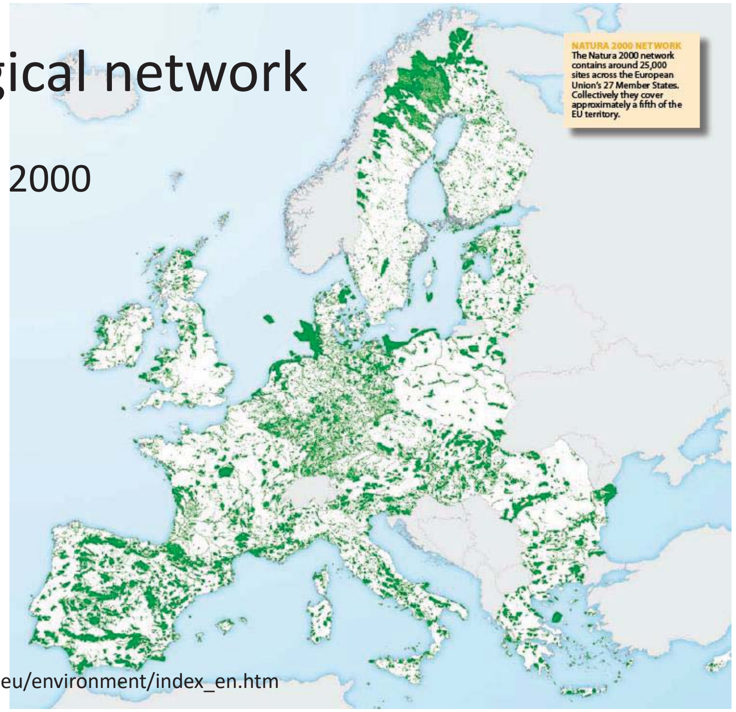
Credit: Elke Hahn, Member of the IENE Steering Committee/ Ministry for Transport, Innovation and Technology of Austria

Amphibian tunnels

Credit: Elke Hahn, Member of the IENE Steering Committee/ Ministry for Transport, Innovation and Technology of Austria

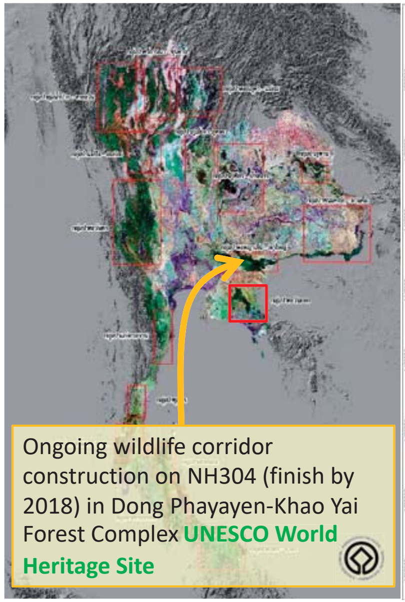
Ecological network

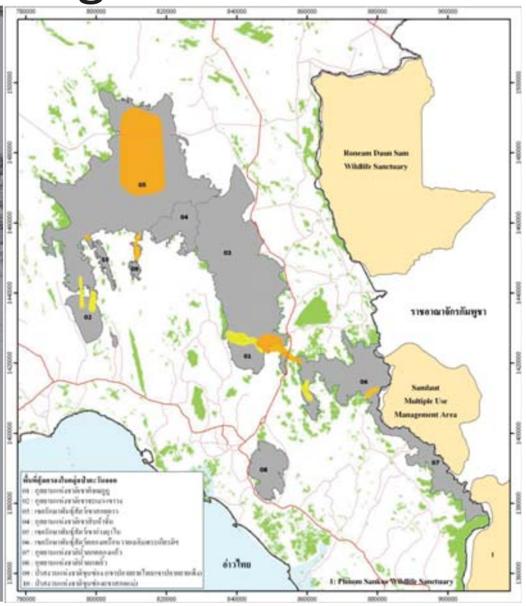
- Natura 2000



http://ec.europa.eu/environment/index_en.htm

Thailand ecological network



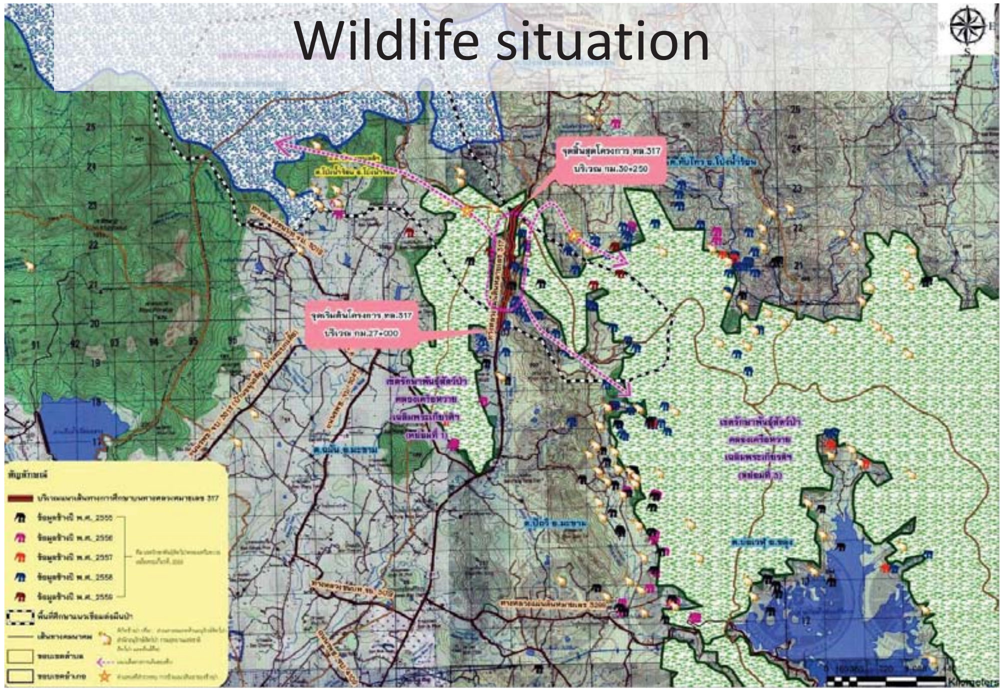


Project site

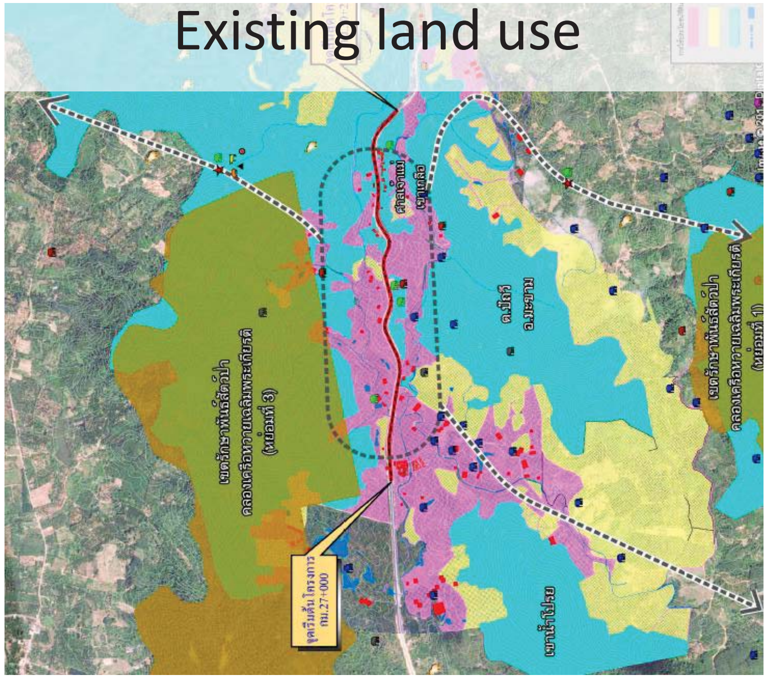
- NH317 km.27-29

EEC

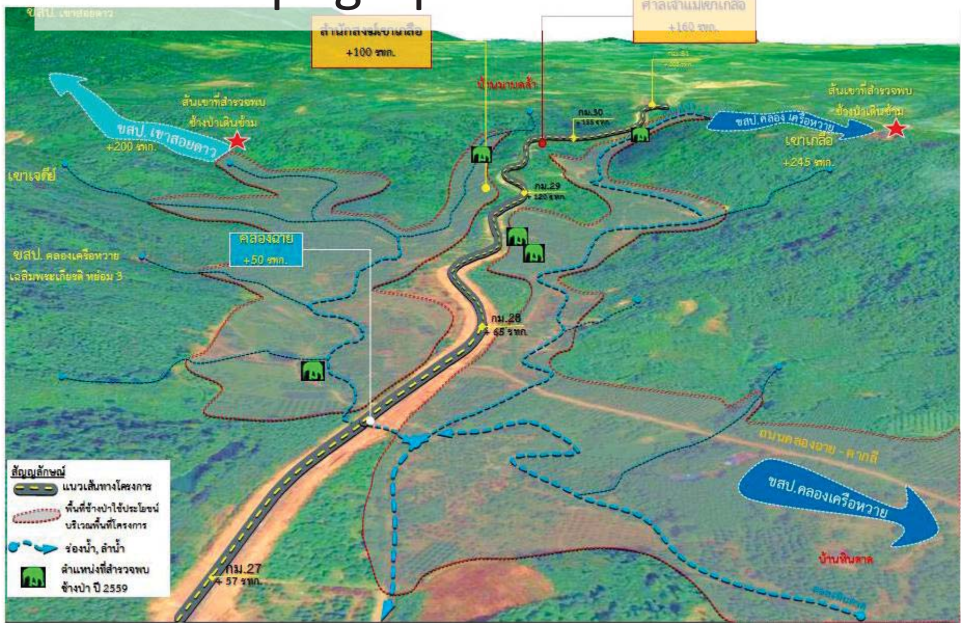
Wildlife situation



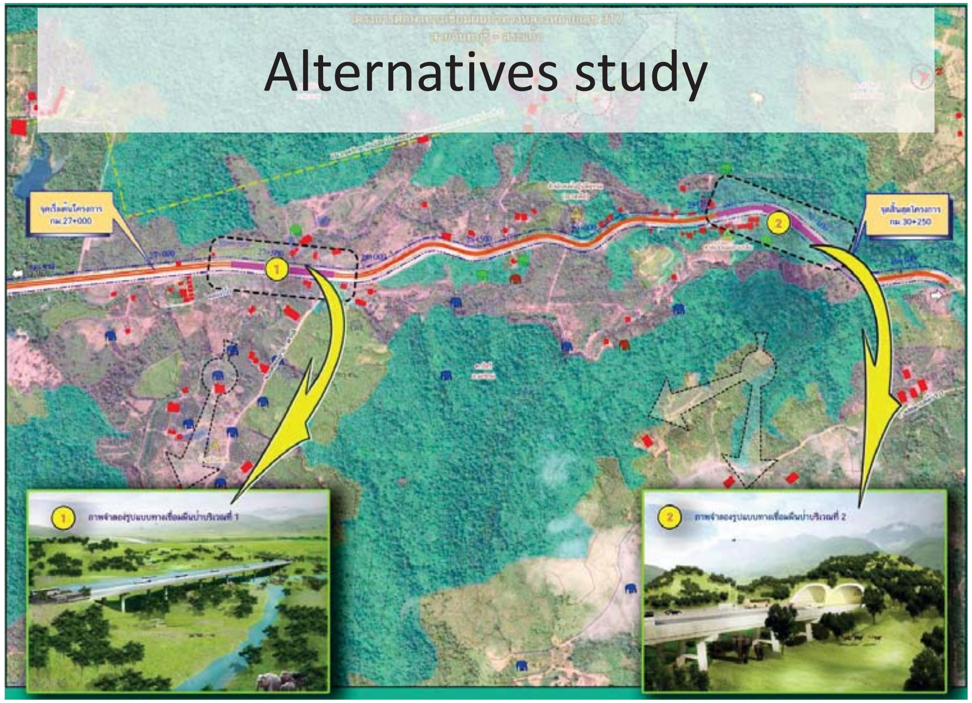
Existing land use



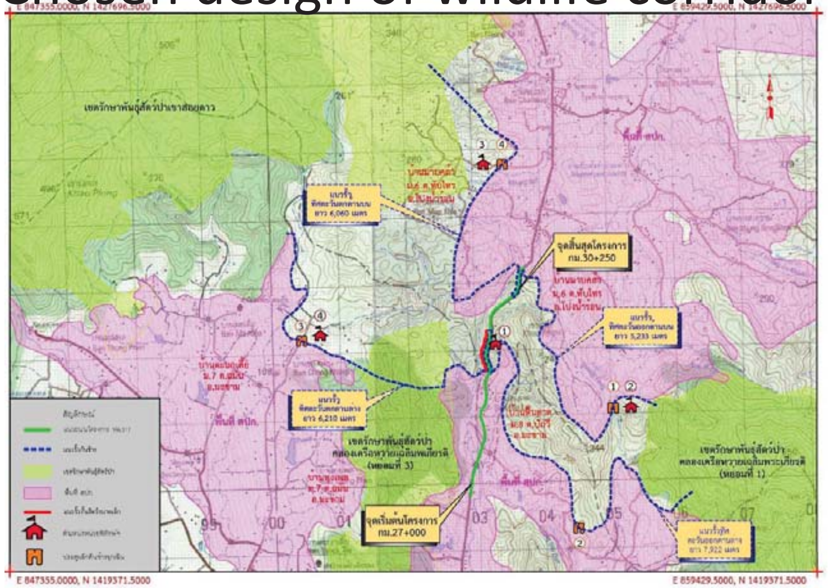
Topographical feature



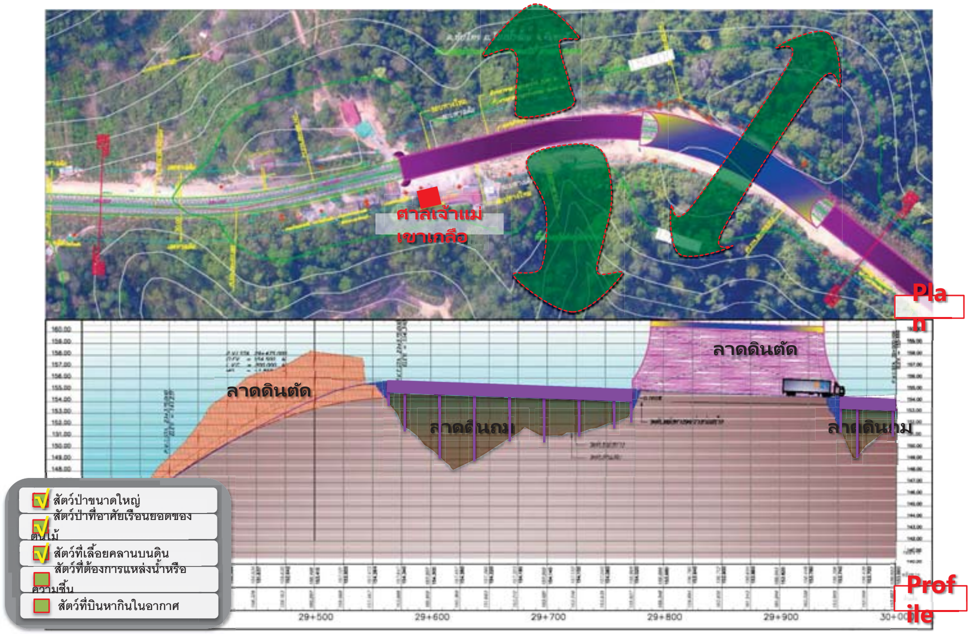
Alternatives study



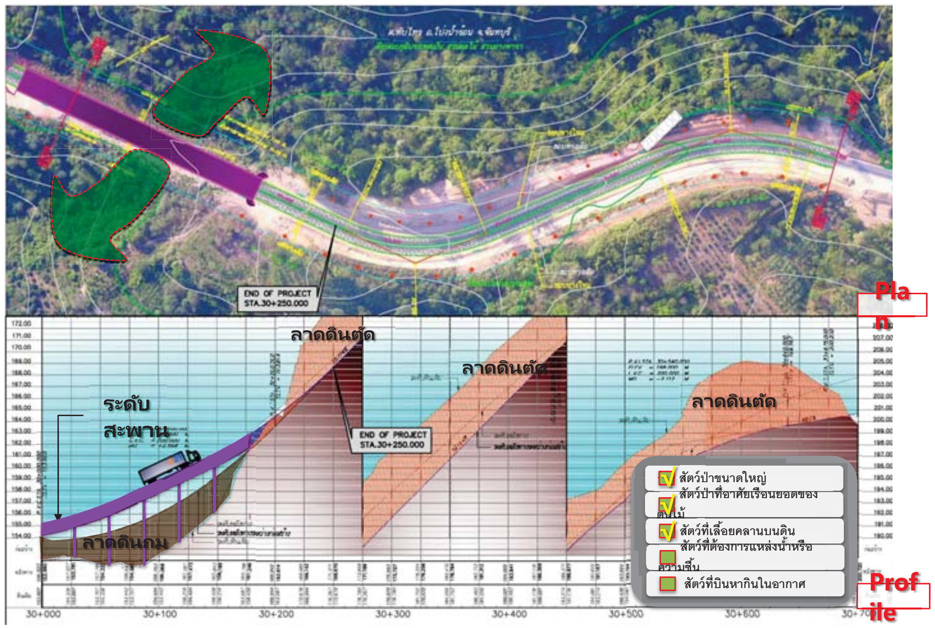
Chosen design of wildlife corridor



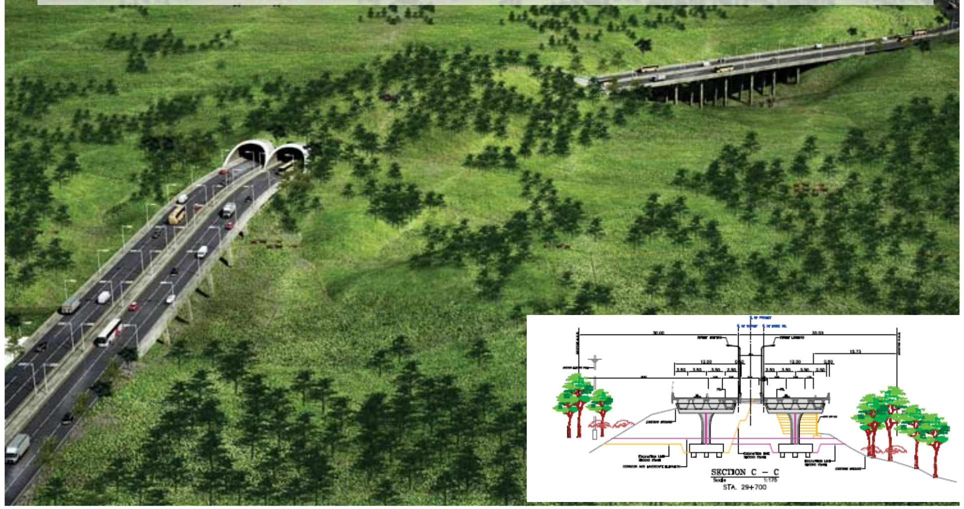
Chosen design of wildlife corridor



Chosen design of wildlife corridor



Wildlife corridor design



Wildlife corridor design

Elephant guide fence design

Project premise

- Environmental responsibility
- Multiple related agencies
- Uncertain course of action
- Land stewardship concept …?

Project impacts

- Emphasis on affected key stakeholders
- General impacts vs. unique impacts
- Direct vs. indirect impacts

COEXISTENCE!

Impacts and mitigation for **people inside the corridor**

Impacts

- Increase risk of encounter and damages
- Stress
- Limited access
- Possibility of relocation

Mitigation

- Warning system
- Compensation scheme
- Training and education
- Provision of access gates
- Compensation – *complicated issue*

Impacts and mitigation for **people outside the corridor**

Impacts

- Reduced risk of encounter and damage (+)
- Possible hazard from lowered awareness

Mitigation

- Training and education

Impacts and mitigation for **local officers**

Impacts

New responsibilities

- Wildlife monitoring
- Poaching prevention
- Assistance for safe coexistence
- Elephant food source management
- Guide elephants into the corridor

Mitigation

- Budget allocation
- Human resource allocation
- Training and knowledge transfer

Learnt lessons

- Challenges
  - Opposition from the locals
  - Information verification
  - Uncertainties and lack of confidence
- Recommendations
  - Need shared vision for greener highway with ecological network
  - Closer collaboration among agencies

Summary

- Combination of viaducts and tunnels proposed for a wildlife corridor on NH317 at km. 29+550 – 30+175 along with guide fences (4 fences, 5-8 km long)
- Key impacts to locals due to fences
- Require more detail survey, design, and study for implementation
- Collaboration for future greener highways

Thank you for your attention

Win Trivitayanurak

Email: win.trivitayanurak@gmail.com

Third Speaker of <Session 3C>

Mr. Tali Trigg
Project Director at Deutsche
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E-mail: tali.trigg@giz.de

Brief Biography:

Mr. Tali Trigg joined GIZ in 2015 and is the Project Director of its Transport and Climate Change project, a partnership with ASEAN, which is based in Bangkok, Thailand. His work focuses on fuel economy, green freight, Nationally Appropriate Mitigation Actions (NAMAs) and Measurement, Reporting and Verification (MRV). This entails working with ASEAN countries to develop national action plans on sustainable transport, as well as engaging with the ASEAN Secretariat and its Working Group to develop and implement an over-arching transport plan for the region. Previously, Mr. Trigg worked at the International Energy Agency (IEA) as an Energy Analyst between 2010-2015. At the IEA, he conducted energy modelling, technology policy analysis (lead author of Energy Technology Perspectives 2014), and spearheaded its efforts on the intergovernmental Electric Vehicles Initiative (EVI), working on data collection and research collaboration, culminating in the EV City Casebook (launched in May 2012) and more recently the Global EV Outlook (launched in April 2013). His focus was on transportation issues and technologies, with an emphasis on smart growth policies, bus rapid transit (BRT), and electric vehicles (EVs). He conducted energy modelling to assist with IEA's efforts to better understand the implications of an improved vehicle technology adoption scenario, as well as a modal shift scenario, one wherein vehicle ownership and driving patterns "shift" downward due to 1) better public transit options as well as 2) reduced demand. He was also the Desk Officer for the Implementing Agreement for Co-operation on Hybrid and Electric Vehicle Technologies and Programmes (HEV IA) (www.ieahev.org). On BRT, he has worked closely with EMBARQ (www.embarq.org) to successfully launch the first ever globally encompassing BRT Database (www.brtdata.org). Prior to working in the transportation field, Mr. Trigg was a journalist working on business and energy topics. He eventually moved to the cleantech sector working for the Institute for Transportation and Development Policy (ITDP) (www.itdp.org) as well as the Rocky Mountain Institute (RMI (www.rmi.org). After that he worked as a research associate for the Center on Globalization, Governance & Competiveness (CGGC) (www.cggc.org) conducting value chain analyses focusing on the cleantech sector, including a study on lithium-ion batteries for electric vehicles. He received a Bachelor's degree in Political Science from Georgetown University and a Masters of Environmental Management at Duke University.

ASEAN Fuel Economy Platform
By Mr. Tali Trigg

Summary:

There are over a billion motor vehicles across the world today, with that number expected to grow to over 2.5 billion by 2050, almost entirely (more than 90%) as a result of motorisation in developing and emerging economies. Of this, there could be an estimated 515 million vehicles across the ASEAN region in 2050. Furthermore, the transport sector is a major user of energy, representing approximately 27% of ASEAN-wide energy demand.

For Thailand, according to the Department of Land Transport (DLT), as of December 2015, Thailand has total of 36.7 million registered vehicles. This has huge implications, particularly for GHG emissions and energy demand. Department of Alternative Energy Department and Efficiency (2015) estimated that one-third of final energy consumption is consumed within the transportation sector with approximately 80% of all energy use comes from road transport.

In terms of CO2 emission, transportation sector contributed CO2 emission about 30% to total energy related emissions with 98% of the emissions comes from the road transport sector. These two facts highlight the importance of the road transportation sector when it comes to energy and environmental concerns in relation to climate change mitigation. Hence, fuel efficiency policy is considered as a promising candidate to effectively reduce energy consumption, as well as to reduce greenhouse gas and pollutant emissions.

International Energy Agency (IEA) forecasted that a world with no dedicated action regarding energy use and climate change cause the temperature raise to six-degree in 2050 - the six-degree scenario (6DS). Based on the emission scenarios developed by the IEA (2014), and within the context of the transport sector, Global Fuel Economy Initiative (GFEI) estimated that with three necessary mitigation strategies, comprising avoid, shift and improve, will accordingly limit global temperature increase to 2 degrees Celsius. GFEI further indicated that only improving fuel efficiency of light duty vehicles using today's available technologies alone has the potential to almost stabilize greenhouse gas emissions at today's levels.

All ASEAN member states (AMS) have signed the Paris Agreement aimed at keeping global temperature rise from anthropogenic climate change to below 2 degrees Celsius above preindustrial levels and to strive to limit it to 1.5 degrees Celsius. The Kuala Lumpur Transport Strategic Plan (KLTSP) 2016-2025; the strategic transport plan of ASEAN, has set a specific goal on the development and implementation of fuel economy policies and standards. Therefore, some of the efforts are already being made to contain transport emissions via improvements to FE in AMS and Thailand. This also includes examples like the feebate system in Singapore, eco-sticker programme in Vietnam, and fiscal policies in Malaysia.

Thailand so far has already set the policies and target in energy efficiency and climate change mitigation. According to the Energy Efficiency Plan (EEP: 2015-2036), Ministry of Energy already set a target to reduce Energy Intensity 30% by 2036 where transportation sector accounts for 58% of the EI target. The implementation plan emphasizes on increasing of efficiency in the use of fuel in vehicles. Under these policies, in October 2015, the labelling scheme – the so-called EcoSticker – has been introduced. Furthermore, the new CO2-based excise tax has been applied to the new vehicle purchase since January 2016.

However, according to the study of GIZ (2016), between 2013 to 2015, sales-weighted average fuel consumption of new passenger light duty vehicles (PLDV) has not changed much, from approximately 6.98 to 7.08 Lge/100km (equivalent to about 171.70 to 174.19 gCO2/km). Since FE is chiefly affected by the size of a vehicle and its engine, policy improvements aimed at consumers and manufacturers are so important. Therefore, GIZ supports the establishment of an ASEAN Fuel Economy Platform to support the drafting of a regional fuel economy roadmap in order to harmonise policies across the ASEAN. On a national level, GIZ is supporting FE policy improvement by creating evidence based recommendations on FE improvement. However, further discussion and strong collaboration between industrial sectors, academia and government is crucial in order to improve vehicle efficiency.

10TH ATRANS ANNUAL CONFERENCE (SYMPOSIUM): YOUNG RESEARCHER'S FORUM 2017

ASEAN Fuel Economy Platform

Tali Trigg

Project Director

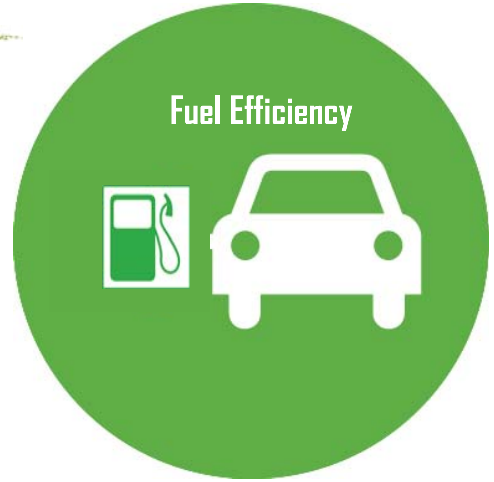
ASEAN-German Technical Cooperation Project
"Energy Efficiency and Climate Change Mitigation in the Land Transport Sector in the ASEAN Region"

18 August 2017

Radisson Blu Plaza Hotel , Thailand

Outline

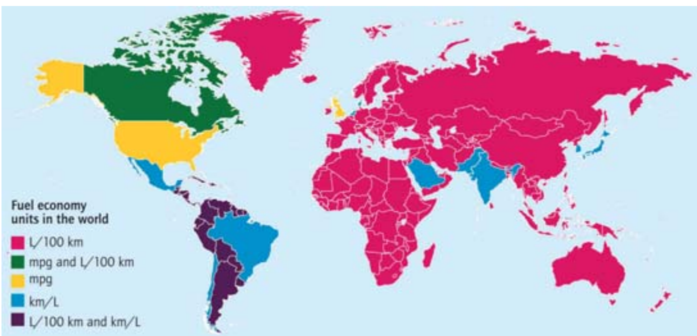
Introduction - some definitions
Why is FE improvement important?
FE policies
Initial results from GIZ's study
Future works toward FE improvement
Conclusions



Pic © Modified from https://nanosteelco.com

Introduction - some definitions

Definitions: Fuel efficiency – "fuel economy – fuel consumption"

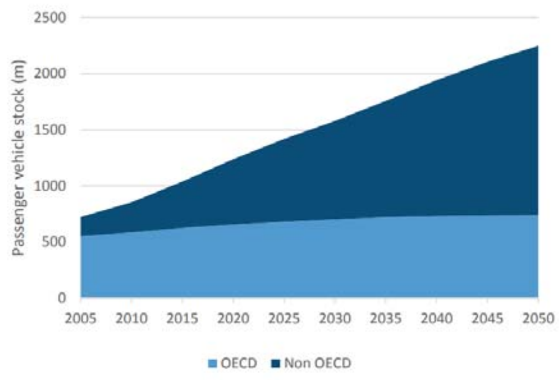


Source: IEA Technology Roadmap: Fuel Economy of Road Vehicles

- Fuel economy: km/l
- Fuel consumption: l/100km
- Fuel efficiency: MJ/pkm or MJ/tkm

Why is FE improvement important?

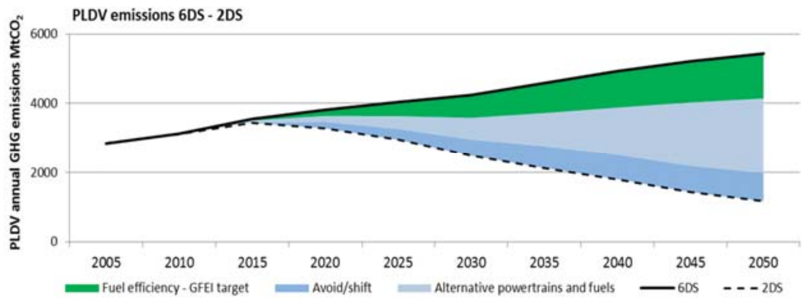
The global fleet of light duty vehicles is set to increase massively by 2050, from around 850 million passenger cars in 2013 to over 2 billion by 2050, with nearly 90% of this growth in non-OECD countries



GFEI (Global fuel economy initiative), 2016, http://www.globalfueleconomy.org/media/203446/gfei-state-of-the-world-report-2016.pdf

Why is FE improvement important?

Car fuel efficiency is a "low-hanging fruit" for GHG mitigation



- Transport accounts for 23% of energy related carbon emissions
- Reducing fuel consumption (L/100km) by 50% until 2050 can save up to 33 Gt CO2 and up to USD 8 trillion globally

Source: GFEI State of the World 2016

Why is FE improvement important?

Benefit of improved FE and reducing emission

74% of transport CO_2 emissions from road vehicles

In 2014, total global CO_2 emissions were **38Gt**. Out of the **8.8Gt** of total transport emissions, **74% (6.5Gt)** were from road transport.

300 fewer power stations

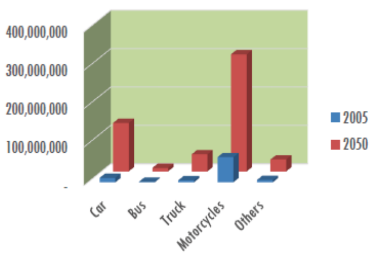
The **33Gt** of CO_2 that could be saved between 2015 and 2050 is roughly the equivalent of closing **300** coal power stations over the same time period.

$2 trillion savings

A total of **$2 trillion** could be made in fuel savings by 2025, **$500 billion** of which would fund the costs of initiating a transition to electric vehicles.

Source: GFEI State of the World 2016

Why is FE improvement important?



Half a billion vehicles in ASEAN in 2050

- **515 million** vehicles in 2050
- **389** 4-wheeled vehicles/1000 people
- **388** 2 and 3-wheeled vehicles/1000 people
- **2.5** million cars will be added per year
- **5.3** million motorcycles will be added per year

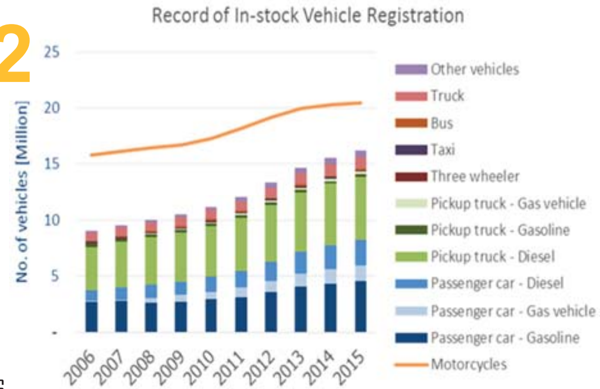
Source: ITPS, CAA, 2014

Source: ITPS and CAA, 2014

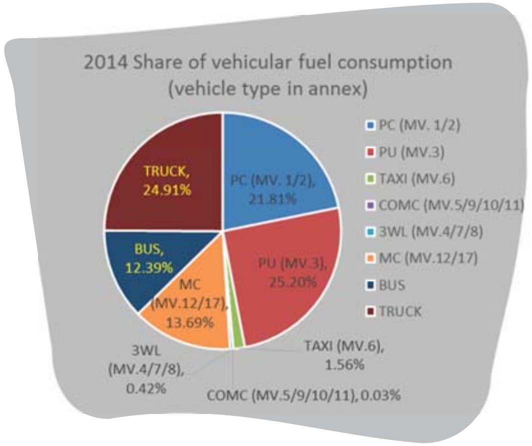
Why is FE improvement important?

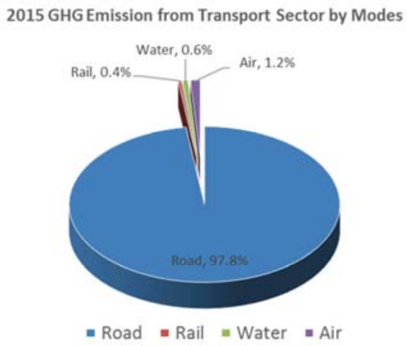
36.12 Million

Number of Vehicle under Motor Vehicle Act Registered in Thailand as of 31 December 2016



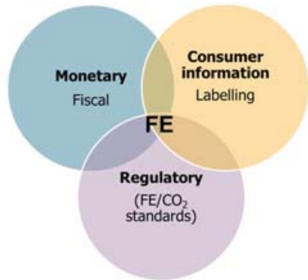
Why is FE improvement important?

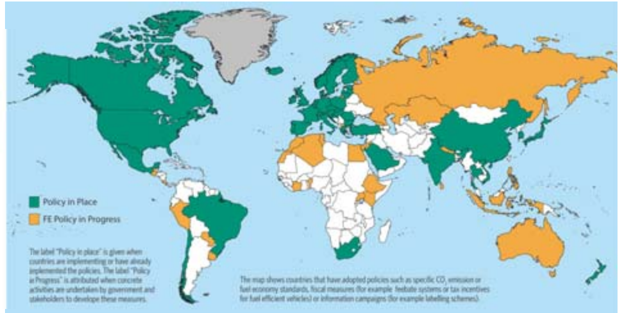




FE policies

Fuel economy policies around the world

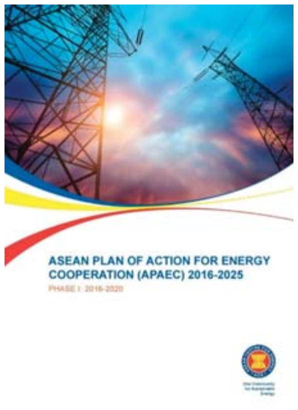


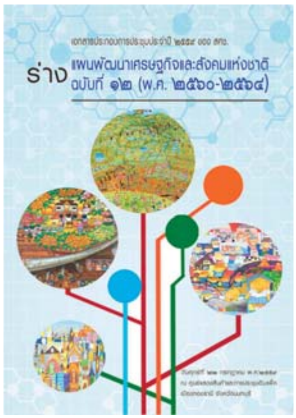


Source: GFEI State of the World 2016

- More than 80% of the global PLDV market is regulated
- Vietnam, Thailand have fuel economy policies in place, Philippines, Malaysia, Indonesia are on the way to develop FE policies

FE policies





FE Policy in ASEAN & Thailand

http://www.asean.org/storage/2016/01/11/publication/KUALA_LUMPUR_TRANSPORT_STRATEGIC_PLAN.pdf
http://www.aseanenergy.org/wp-content/uploads/2015/12/HighRes-APAEC-online-version-final.pdf
http://www.nesdb.go.th/Portals/0/news/plan/P12/Book_Plan12.pdf

FE policies

Fuel Economy in the KLTSP

Sustainable Transport Goal 1.3.: " *Initiate and support to the development and implementation of fuel economy policies and standard as well as policies towards cleaner fuels and vehicles and vessels*"

Section	KLTSP Milestones
ST-1.3.1	Establish a **platform** to discuss matters related to fuel economy for the transport sector
ST-1.3.2	Formulate a fuel economy **roadmap** for the transport sector in ASEAN including policy guidelines
ST-1.3.3	Support to the development and adoption of nationally appropriate **policies** for cleaner fuels and vehicles

FE policies

ASEAN Fuel Economy Platform

The outputs from the forum will help to steer the development of the **fuel economy roadmap**, a full draft of which is expected by the end of 2017.

- The Fuel Economy Platform is a consultative entity established under ASEAN's Kuala Lumpur Transport Strategic Plan 2016–2025 (KLTSP).
- It aims at supporting the drafting of a regional roadmap on fuel economy, focusing especially on the light duty vehicle fleet, by giving expert advice, providing scientific knowledge, sharing practical experience and information and well as being a forum for exchange of information.
- Link with academics (e.g. ATRANS, EASTS/IRG, etc.)

FE policies: in Thailand

APPROVED Dec 2012 for implementation on 1 Jan 2016

Thailand Vehicle excise tax structure

Categories Of Vehicle	Tax Structure Before Jan'2016				Current Tax Structure			
	Engine Capacity (Horse Power)	Tax Rate (%)			CO_2	Tax Rate (%)		
		E10	E20	E85		E10/E20	E85/NGV	Hybrid
Passenger Vehicles -Passenger Vehicles and, Vans less than 10 seats	≤2,000 CC 2,001-2,500 CC 2,501-3,000 CC >3,000 CC (เกิน 220 HP)	30 35 40 50	25 30 35 50	22* 27 32 50	≤100 g/km 101-150g/km 151-200 g/km >200 g/km >3,000 CC	} 30* 35 40 50	} 25 30 35 50	10 20 25 30 50
PPV / DC /Space Cab/Pick Up	≤3,250 CC >3,250 CC	20/12/ - /3,18 50			≤200 g/km >200 g/km >3,250 CC	25*/12/5/3,18 30/15/7/5,18 50		
Eco Car (Benzine/Diesel) / E85	1,300/1,400 CC	17			≤100 g/km 101-120 g/km	14*/12 17/17		
Electric Vehicle /Fuel Cell/ Hybrid	≤3,000 CC >3,000 CC	10 10 50			>3,000 CC	10 ** 50		
NGV-OEM	≤3,000 CC >3,000 CC	20 50			>3,000 CC	** 50		

NEW HEV-PPV ≤175 g/km= 23% HEV-DC ≤175 g/km= 10%

Updated on 20 June

NEW EV tax=2% Hybrid tax ÷ 2

Updated on 20 June

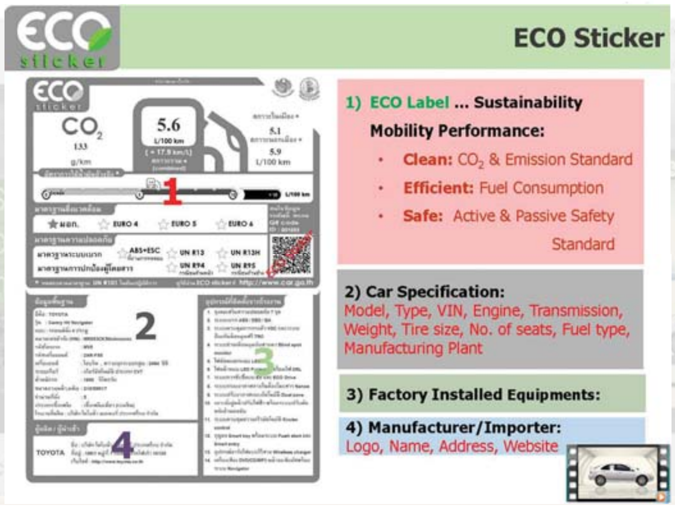
Remarks * : Assign safety standard for Active Safety (ABS+ESC) for Passenger Vehicles and, Vans less than 10 seats must obtain CO_2 ≤150 g/km / PPV must obtain CO_2 ≤200 g/km / Eco Car must obtain CO_2 ≤100 g/km

** Depend on CO_2 emission

* less than 1,780 CC but not over 2,000 CC

Source: http://www.ratchakitcha.soc.go.th/DATA/PDF/2560/E/166/2.PDF

FE policies: in Thailand



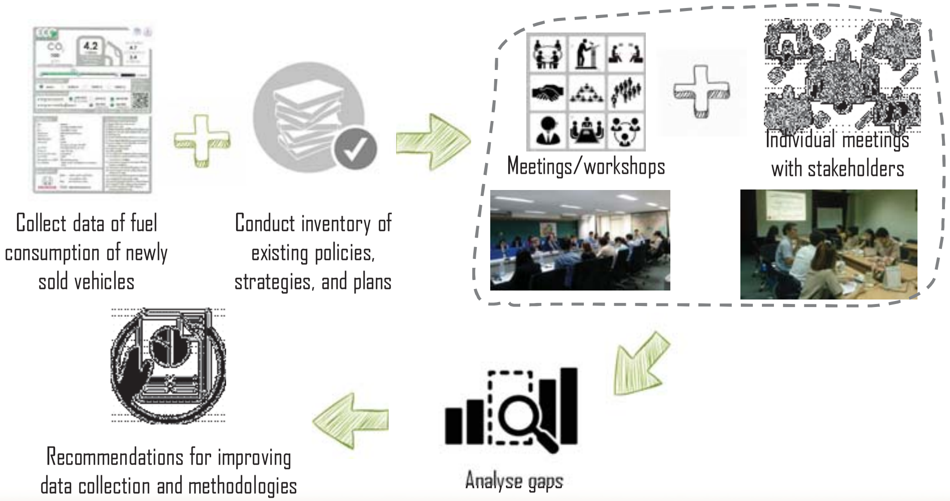
Initial results from GIZ's study

- The study aims to improve understanding regarding fuel efficiency policies of passenger light duty vehicles (PLDVs), including pick-up trucks, and motorcycles in Thailand to further a common understanding among stakeholders.

Improving FE policy and collaboration in Thailand will create benefits for consumers, businesses, government and the environment.

Picture © www.iconexperience.com

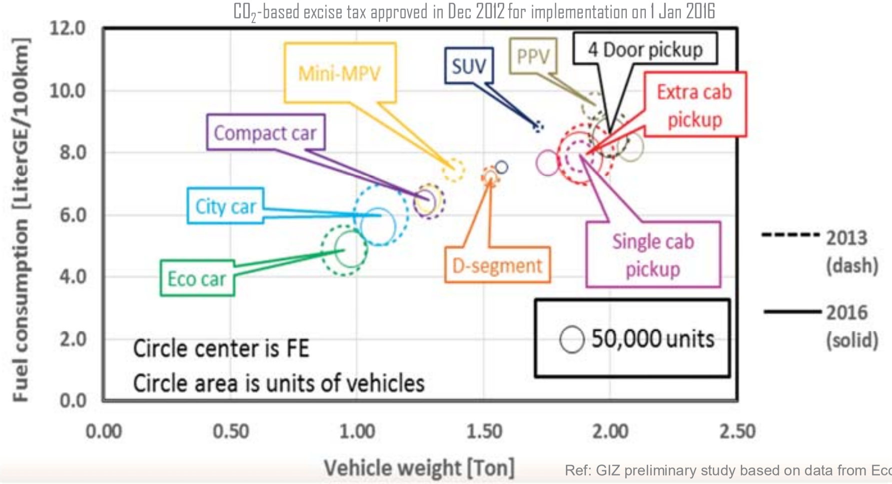
Initial results from GIZ's study



Initial results from GIZ's study

Effect of CO_2-based excise tax by vehicle weight

CO_2-based excise tax approved in Dec 2012 for implementation on 1 Jan 2016



Ref: GIZ preliminary study based on data from Eco-sticker

Initial results from GIZ's study

Average FE of motorcycle sales during 2013-2015

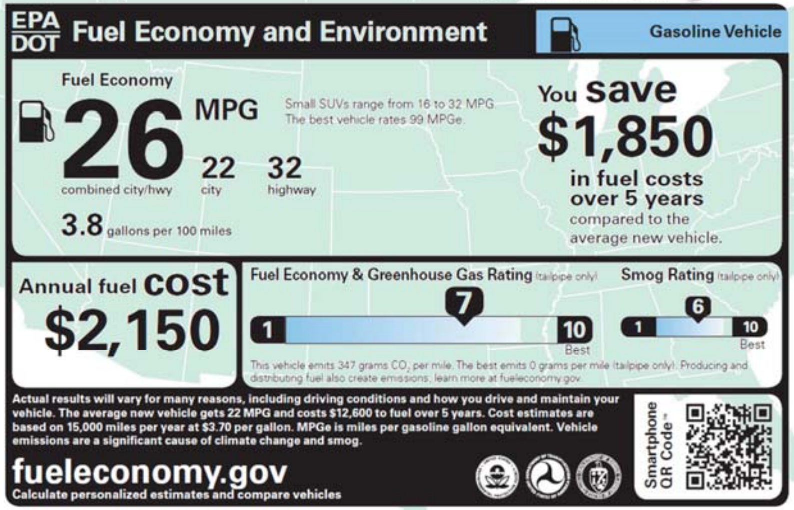
Top 4 brand of MC	New sale (Collected from DLT 2016)			Weight-averaged FC (Lge/100km)		
	2013	2014	2015	2013	2014	2015
Brand1	1,412,238	1,261,949	1,248,402	1.80	1.81	1.73
Brand2	322,121	185,675	182,074	2.16	2.14	2.05
Brand3	4,338	1,645	1,801	2.83	2.39	2.52
Brand4	3,712	19,125	12,947	1.61	1.61	1.61
Sub-total MC (% share of total new MC registration	1,742,409 (87.17%)	1,468,394 (86.43%)	1,445,224 (88.90%)			
Total new MC registration	1,998,934	1,698,984	1,625,742			
Annual weight-averaged FC				1.87	1.85	1.77

Ref: GIZ preliminary study based on data from Department of Land Transport

Future works toward FE improvement

Possible paths toward FE improvement

Car label in USA



Future works toward FE improvement

Options for revision of the excise tax scheme for new vehicles.

- ✓ Introduce a continuous linear function to relate vehicle specific carbon emissions (in gCO2 per km) to the level of excise tax (instead of using the current step function).
- ✓ Raise the incentive to buy more efficient vehicles by making the price increase for inefficient vehicles more progressive (i.e. increase the slope of the linear function), or even provide rebates for very efficient cars.
- ✓ Foster the uptake of plug-in hybrids and battery electric vehicles by excluding them from the excise tax.

Pic © http://www.kiplinger.com

Future works toward FE improvement

Possible paths toward FE improvement

Consider the introduction of additional fiscal measures to stimulate the use of fuel efficient vehicles.

- ✓ To further incentivise the uptake of efficient vehicles in the short term, focus on the use of additional fuel economy-based (Lge per 100km) or carbon emission-based (gCO2 per km) fiscal measures instead of the complex task of introducing fuel economy standards, e.g. an annual carbon emission based vehicle registration tax or an increase of the fuel tax.

Conclusions

- The road transportation sector accounts for a significant share of Thailand's consumer and government spending as well as congestion and pollution….
- … but policies to improve FE of LDV have great potential to reduce fuel use, GHG, and fuel expenditures.
- FE policies need country-specific tailoring, but ideally build on common metrics and methodologies across the region. FE baseline data is an essential ingredient for any policy.
- Momentum to advance FE policies in the region continues but there is diversity in the status and progress of these policies among AMS.
- A regional FE Roadmap is considered vital for accelerating progress in the development of policies and for facilitating a coherent approach among countries
- Further discussion and strong collaboration between industry, academia and government is crucial in order to effectively improve vehicle efficiency.

THANK YOU

for your kind attention!

For more information, please visit

www.TransportandClimateChange.org

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Energy Efficiency and Climate Change Mitigation in the Land Transport Sector in the ASEAN Region

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Fourth Speaker of <Session 3C>

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Brief Biography:

Assistant Professor Dr.Amornrat Kaewpradap works as lecturer at department of mechanical engineering, faculty of engineering, King Mongkut's University of Technology Thonburi. Her works are lecturer and research about gas combustion flames. Moreover, she is the secretariat of Electric Vehicle Association of Thailand (EVAT) and project manager of EV Charging Station Promotion Project supported by The Energy Conservation Fund (ENCON), Energy Policy and Planning Office, Ministry of Energy.

Electric Vehicle Charging Station Promotion in Thailand
By Asst. Prof. Dr. Amornrat Kaewpradap

Summary:

Electric Vehicle Charging Station Promotion in Thailand

1. EV status overview in Thailand

Generally, the technology of EV is developed and demonstrated from PHEV to BEV. Because of high cost gap between ICE vehicle and EV and consumed merely by Niche market, thus stable and technology-specific incentive are promoted. When the cost gap is low, the technology-neutral
and declining support will be done. Finally, the energy efficiency is developed as mature technology of EV to be mass market. In order to reduce emission in transportation part, electric vehicle (EV) is
widely used in many countries. EV was also started many years ago and promoted as Energy Efficiency Plan 2015-2036 (EEP 2015) in Thailand. Following EEP 2015, Ministry of Energy which plan the EV support measurements to support for 1.2 million EVs in 2035.

2. EV policy and promotion in Thailand

There are five EV promotions from National Research Council (NRC) as electric vehicle hub, EV usage, EV production and supporting local EV company, EV components and investment. Department of Land and transportation promoted new register requirement of the electrical power, small EV and two wheels EV. Moreover, socket and inlet standard were promoted by Thailand industrial Standards Institute. EV Charging Station Promotion in Thailand was supported by Energy Conservation Fund (ENCON Fund), Energy Policy and Planning Office (EPPO), Ministry of Energy.

3. EV Charging Station Promotion in Thailand

Following EV Charging Station Promotion, it was managed by EVAT to support organization targets such as hotel, office and public service. 150 EV Charging Stations Promotion was supported by ENCON fund, Energy Policy and Planning Office (EPPO), Ministry of Energy. Since July 2016, this
promotion subsidy for public and private sectors as 100% and 30%-70% of charger cost. Quick and normal chargers are supported in this project and charger specifications according to Thailand industrial Standards Institute. Now, EV Charging Station Promotion is opening during 17th July to 31st August to apply in the 4th round. Application details can be seen at www.evat.or.th

Electric Vehicle Charging Station Promotion in Thailand

Asst. Prof. Dr. Amornrat Kaewpradap
Department of Mechanical Engineering, Faculty of Engineering,
King Mongkut's University of Technology Thonburi
Secretariat of Electric Vehicle Association of Thailand

The 10th ATRANS Annual conference on
"Transportation for a Better Life: Mobility and Road Safety Managements"

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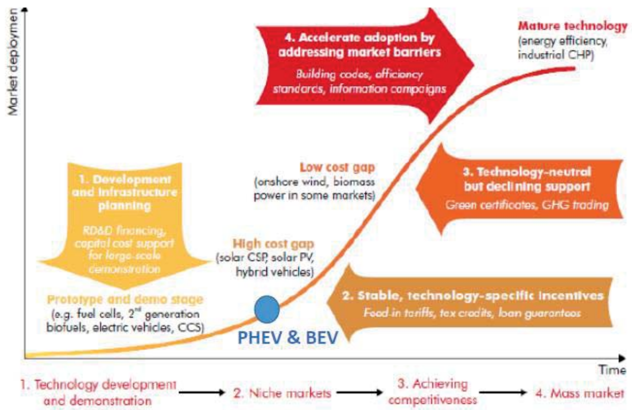
EV Status Overview



Note: The figure includes generalised technology classifications; in most cases, technologies will fall in more than one category at any given time.

Source: IEA (2010) Energy Technology Perspective

EV Status Overview in Thailand

Key Concerns:

SUPPLY	DEMAND
Lack of Standardization among EV component technologies	Economies of Scale – Lack of Demand volumes resulting in high price
Lack of EV infrastructure, free and access to all electricity network	Low Consumer confidence in terms of safety and range anxiety along with low fuel costs

Challenges for BEV business:
- Wide standardize fast charging modes
- Increase availability of EV fast chargers
- Free and easy access to electricity network
- Lower Cost of Battery
- Improve Vehicle Driving Range
- Improve Charging time
- Obtain Driver Information

EV Policy and Promotion in Thailand

Development of EV Policy in Thailand

NRC proposed the National EV promotion project to Thai government.

Feb 2015	March 2015	April 2015	Dec 2015
National Reform Council (NRC)	**Thai Government** **Prime Minister**	Ministry of Industry Ministry of Science and Technology (NSTDA) Ministry of Energy	**By the end of 2015** • EV prototype • Battery development • Energy resources

EV Policy and Promotion in Thailand

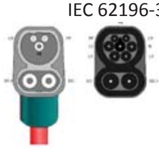
NRC's EV Promotion Recommendations

- Promote Thailand as an ASEAN Electric Vehicle Hub
- Promote Electric Vehicle Usage on Thai Roads
- Promote Electric Vehicle Production in Thailand and Supporting Local EV Company
- Support R&D of EV, EV Parts and Components and Charging Station
- Support Investment of EV in Thailand

EV Policy and Promotion in Thailand

Thailand Industrial Standards Institute

Sockets and Inlets Standard

Vehicles	AC Charger	DC Charger	Vehicles
Electric Bus	IEC 62196-2 Configuration Type 2  Phase: 1ϕ / 3ϕ Rated Current: 70A (1 ϕ) / 63A (3 ϕ) Rated Voltage: 480 V Capacity: Up to 22 kW (Mode 2) Up to 43 kW (maximum)	IEC 62196-3 Configuration FF  Rated Current: Up to 200 A Rated Voltage: ≥ 500 V DC Communication Protocol: PLC	Electric Bus
Electric Passenger Car			Electric Passenger Car

	System A CHAdeMO (Japan)	System B GB/T (PRC)	System C COMBO1 (US)	System C COMBO2 (DE)
Connector				
Vehicle Inlet				
Communication Protocol	CAN		PLC	

EV Policy and Promotion in Thailand

Land Transport

Previous Registration Regulation

- **E-Motorcycle:**
  Motor capacity ≥ 500 W and Max. speed ≥ 45 km/hr.
- **Tricycle:**
  Motor capacity ≥ 4 kW and Max. speed ≥ 45 km/hr.
- **4 Wheelers:**
  Motor capacity ≥ 15 kW and Max. speed ≥ 45 km/hr.

New Registration Regulation

- **E-Motorcycle:**
  Motor capacity ≥ 250 W (rated power) and Max. speed ≥ 45 km/hr.
- **Tricycle:**
  Motor capacity ≥ 4 kW (rated power) and Max. speed ≥ 45 km/hr.
- **4 Wheelers:**
  Motor capacity ≥ 15 kW (rated power) and Max. speed ≥ 90 km/hr.
- **Compact EV:**
  Vehicle weight (excluding battery) ≤ 450 kg (for passenger) or ≤ 600 kg (for goods) and Motor capacity ≥ 4 kW (rated power) and Max. speed ≥ 45 km/hr.

EV Policy and Promotion in Thailand

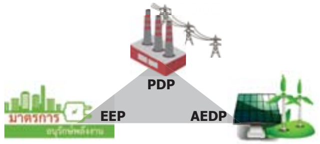
According to **Energy Blueprint (Energy 4.0)**, in 2036

Target

Reduce Energy intensity by 30%
Focusing on transportation sector which is the highest energy consumption

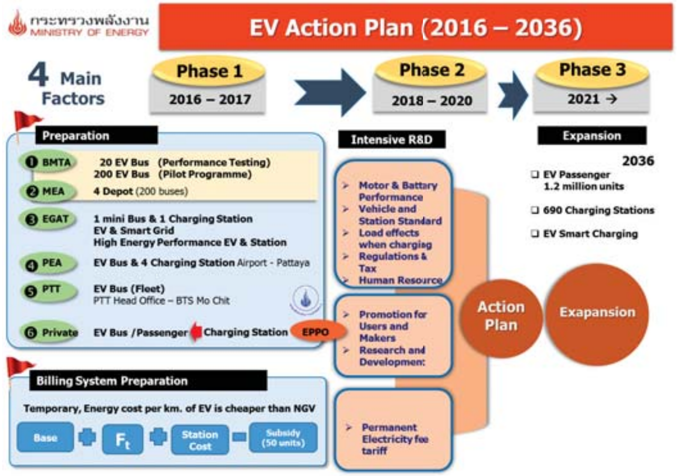
1.2 Million EV (PHEV&BEV)

690 Charging stations



Energy demand deduction = 1,123 ktoe
(transportation sector)

EV Policy and Promotion in Thailand



Approved by National Energy Committee, chaired by the Prime Minister on 11 March 2016

EV Policy and Promotion in Thailand

Electric Vehicle Promotion Package
by Thailand Board of Investment (BOI)

Battery Electric Vehicle (BEV)

Import Tax Exemption for Machine & Corporate Income Tax (CIT) Exemption for 5 - 8 Years (Applied by 31 Dec 2018)

BEV
CBU Import Tax 0% for 2 years and Excise tax 2%

Produce more than 1 important part for tax exemption of 1 year/part with total CIT exemption of no more than 10 years

Battery Electric Bus (e-bus)

Import Tax Exemption for Machine & Corporate Income Tax (CIT) Exemption for 3 Years (Applied by 31 Dec 2018)

Produce more than 1 important part for tax exemption of 1 year/part with total CIT exemption of no more than 6 years

EV Policy and Promotion in Thailand

Electric Vehicle Promotion Package
by Thailand Board of Investment (BOI)

Hybrid Electric Vehicle (HEV)

Import Tax for Machine Exemption (Applied by 31 Dec 2017)

HEV & PHEV
Excise tax based on CO_2 emission
≤ 100 g/km excise tax 5%
101-150 g/km excise tax 10%
151-200 g/km excise tax 12.5
> 200 g/km excise tax 15%

Plug-in Hybrid Electric Vehicle (PHEV)

Import Tax Exemption for Machine & Corporate Income Tax (CIT) Exemption for 3 Years(Applied by 31 Dec 2018)

Produce more than 1 important part for tax exemption of 1 year/part with total CIT exemption of no more than 6 years

EV Policy and Promotion in Thailand

Electric Vehicle Promotion Package
by Thailand Board of Investment (BOI)

13 Important Auto Parts

Import Tax Exemption for Machine & Corporate Income Tax (CIT) Exemption for 8 Years

Plus 50% CIT reduction for another 5 years for locating at Eastern Economic Corridor (EEC) (Applied by 29 Dec 2017)

EV Charging Station Projects in Thailand

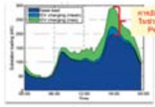
EGAT

1. Pilot project: electric car, electric minibus and charging station

Compose of:
1. One Electric minibus (rent)
2. One Charging station

Service area: North Bangkok Power Plant
Progress: TOR drafting

2. Pilot project: load management of electric vehicle using smart grid technology



Progress : under technical study and TOR drafting

3. Project: development of standards and energy efficiency labeling (No.5) for the electric vehicle and charging station

Progress: under technical study for defining the suitable energy efficiency standard

MEA

Project: establish of charging station (4 stations) for supporting the electric vehicle pilot project of Bangkok Mass Transit Authority

Progress :
- Designing and construction of charging station for supporting the electric vehicle pilot project of Bangkok Mass Transit Authority

PEA

Pilot Project: electric public bus and charging station (4 stations)

- Tourist transportation, Suvanabhumi airport-Pattaya
- Progress : approved Budget, under the contract signed
- Planning to install charging station for 4 places as below

EV Charging Station Projects in Thailand

PTT

Pilot Project: electric van for personnel transportation between PTT head office and BTS station

- Progress : finding service company
- Electric van will be available on first quarter of 2017

MBTA

Project for procurement of electric bus (200 buses)

Chulalongkorn

Progress: Opening the Charging station for studying the Smart Grid & Smart Mobility

KMUTT

Project: **KMUTT Charge & Share : Electric Vehicle Charging and Car Sharing Zones**

Progress: Develop the project with partners and opening 2 charging stations at KMUTT BangMod campus & KX campus

EV Charging Station Promotion in Thailand

Electric Vehicle Promotion Package
by Thailand Board of Investment (BOI)

Public Smart Charging Station

Import Tax Exemption for Machine & Corporate Income Tax (CIT) Exemption for 5 Years(Applied by 31 Dec 2018)

It is required at least four EV charger outlets with one quick charger outlet.

EV Charging Station Promotion in Thailand

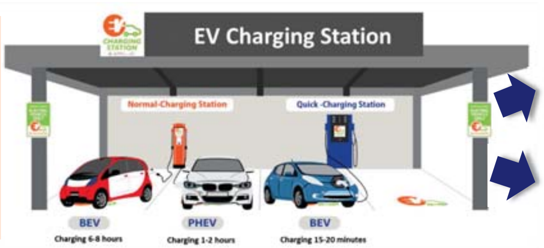
Energy Policy and Planning Office
MINISTRY OF ENERGY

150 EV Charging Station Project Supported by EPPO

Objective — **Supporting Public & Private sectors to buy EV**

Targets

1. **Hotel & Resort**
2. **Department Store**
3. **Offices**
4. **House estate/ Condo**
5. **Public service**
6. **Tourism service**

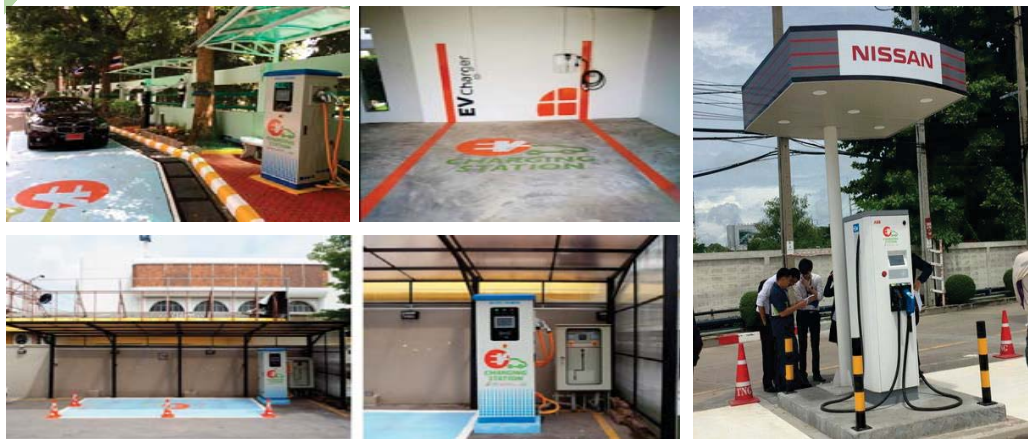


Subsidy for Public sectors
Round 1-4 →100%

Subsidy for Private sectors
Round 1 →70%
Round 2 →50%
Round 3 →30%
Round 4 →30%

EV Charging Station Promotion in Thailand

1st Round of Charging Station Promotion Project



EV Charging Station Promotion in Thailand

1st Round of Charging Station Promotion Project

EV Charging Station Promotion in Thailand

Contacts

Electric Vehicle Association of Thailand (EVAT)

http://www.evat.or.th

Tel : +66 86 390 3339

Email : contact@evat.or.th (General contact)

member@evat.or.th (Membership)

Thank you

< 5th AFTERNOON SESSION >

Session 3: Parallel Session of Main Annual Conference (Symposium)

Session 3D: Intelligent Transportation System (ITS)
Moderated by Assoc.Prof.Dr. Sorawit Narupiti, Chulalongkorn University
Intelligent Use of Probe Data in Map Making By Mrs. Leen D'hondt Tom Tom, Smart City and Traffic Info
Video Analytics for Intelligent Transportation Systems By Dr. Matthew N. Dailey Asian Institute of Technology (AIT), Thailand
Next Generation of Global Navigation Satellite System (GNSS) and its Application in ITS By Dr. Monsak Socharoentum NECTEC, Ministry of Science and Technology, Thailand
ATRANS SAFETY MAP: Mobile Application for Mapping Black Spot Locations By Asst.Prof.Dr. Paramet LUATHEP Prince of Songkla University, Thailand

Moderator of <Session 3D>

Asst.Prof.Dr.Sorawit Narupiti
Department of Civil Engineering, Faculty of Engineering,
Chulalongkorn University, Pathumwan, Bangkok 10330 Thailand
E-mail:kong@chula.ac.th

Brief Biography:

Dr. Sorawit Narupiti is an Associate Professor at Department of Civil Engineering, Chulalongkorn University, where he serves as Head of Department from 2012 to present. He specializes in transportation and traffic engineering especially Intelligent Transportation Systems (ITS). He has been conducting research and development on Intelligent Transportation Systems (ITS) for more than 15 years.

He has numerous academic papers and made presentations on ITS topics at regional conference levels. He is currently a reviewer in some ITS-related journals/conferences and a coordinator of the ITS group at Chulalongkorn University.

He has taught classes on Highway Engineering, Traffic Engineering, Transport Policy and Planning, Intelligent Transport System, Simulation and Modeling and more. Professionally, he served as the President of Thai ITS Association from 2008-2012, the secretary of Intelligent traffic information center (iTIC) foundation which promotes better transport through the use of intelligent transport system data in Thailand. Moreover, he joins many transportation engineering professional associations.

He has involved in ITS activities in Thailand. He served as President of Thai ITS Association (ITS Thailand) from 2008-2012. He is also active in ITS activities in Asia-Pacific region.

First Speaker of <Session 3D>

Mrs. Leen D'hondt
The Sr. Manager Product Marketing
for APAC Maps at TomTom
E-mail: Leen.Dhondt@tomtom.com

Brief Biography:

Mrs. Ir. Leen D`hondt is the Sr. Manager Product Marketing for APAC Maps at TomTom. She is active in the Geospatial Industry for more than 10 years. Born in Belgium, she has been working in Africa, Europe and Asia taking up various roles in both the Public as Private sector. In 2015 she joined TomTom and is responsible for Product Marketing for the Maps of Asia and Oceania.. Leen is currently based in Bangkok.

Intelligent Use of Probe Data in Map Making

By Mrs. Leen D'hondt

Summary:

The world around us is constantly changing. With this comes a demand for maps and location content that provide up-to-date, accurate, contextual information. Keeping up with the real world change is a challenge that map makers have been tackling for the last couple decades.

TomTom has proven to be an innovative leader in the industry by developing technology that leverages intelligent data from automated sources to create high quality maps. TomTom created a platform combining professional mapmaking methods with community input (crowdsourcing). Sensor data from vehicles and partner devices are the next dimension of community input.

TomTom is in an optimal position to be the mapmaker that can handle these large volumes of community data in the fastest, most efficient, and quality-assured way, offering the freshest and most valuable location content.

The use of probe data to build and maintain up-to-date and accurate maps is an important method enabling TomTom to automate map making. Examples are multiple, such as the usage of probe for detection of missing or new geometry, for realignment of geometry, for detecting for example the Direction of Traffic Flow of vehicles and many more.

TOMTOM

INTELLIGENT USE OF PROBE DATA IN MAPMAKING

Leen D`hondt
ATRANS, Bangkok, 18 August 2017

TOMTOM LOCATION TECHNOLOGY

Delivering digital maps and dynamic content to world leading technology and automotive companies

Maps | Real-Time Traffic | Historical Traffic | Location Based services

TOMTOM

MAP FACTS

AS OF Q2 2017

NAVIGABLE MAPS FOR
135 COUNTRIES | **31** TERRITORIES
50+ MILLION KM
OF NAVIGABLE ROADS GLOBALLY

200+ THOUSAND KM
HD MAPS COVERAGE

84+ MILLION
POINTS OF INTEREST

284+ MILLION
ADDRESS POINTS

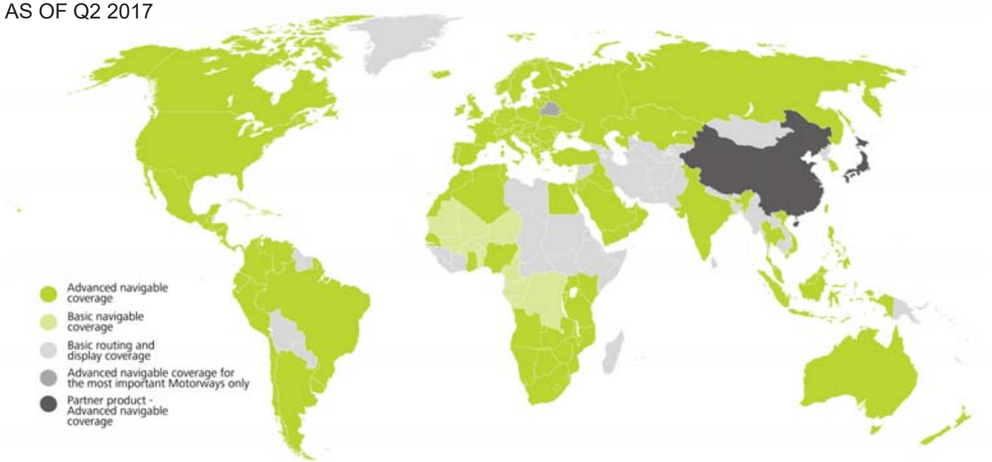
500+ MILLION
CONNECTED DATA SOURCES

3+ MILLION KM
DRIVEN BY MOBILE MAPPING VEHICLES EACH YEAR

TOMTOM

TOMTOM OFFERS GLOBAL MAP COVERAGE

NAVIGABLE MAPS FOR 135 COUNTRIES & 31 TERRITORIES, COVERING 50.3 MILLION KILOMETERS AS OF Q2 2017



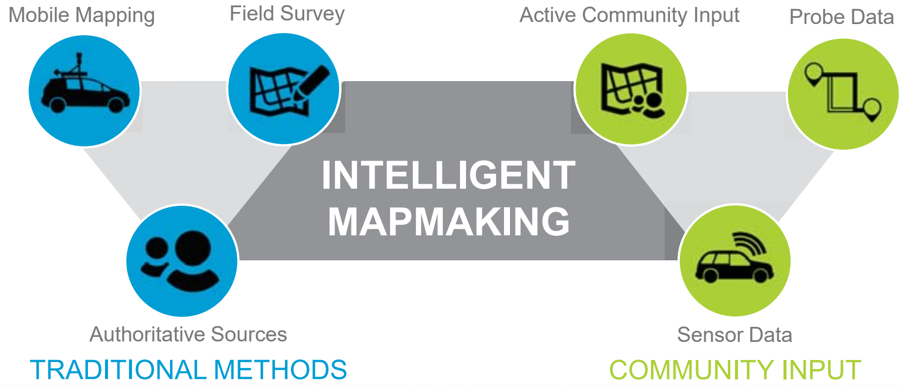
TOMTOM

SOUTH EAST ASIA COVERAGE

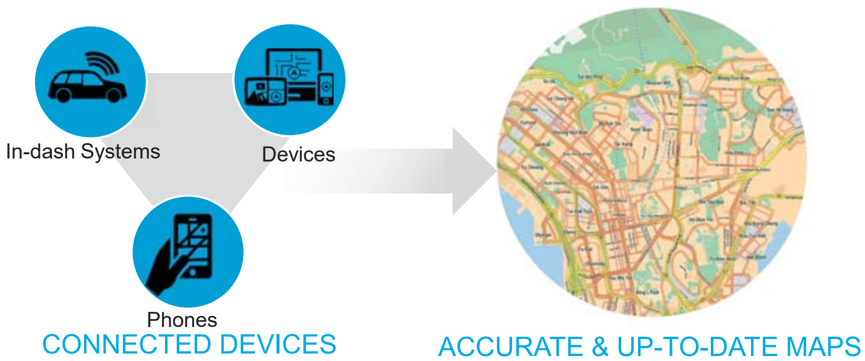
Q2 2017

- **10** Countries
- **Advanced Navigable coverage** for 7 Countries
- Totalling **~2M** km road network
- Combined Points of Interest **~3.7 K**
- **6.4 Million** Address Points
- **1655** 3D Landmarks

INTELLIGENT MAPMAKING ENABLES TOMTOM TO CONTINUALLY PUBLISH A HIGHLY ACCURATE MAP EFFICIENTLY



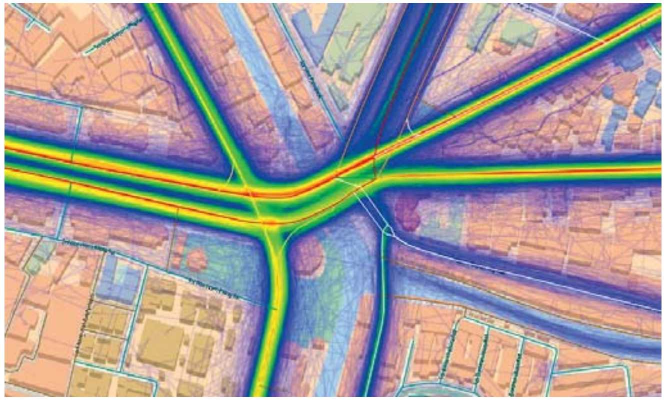
MASSIVE TOMTOM PROBE DATA USED AS ONE OF THE SOURCES IN MAPMAKING



2.1 Billion km of probe collected per day globally

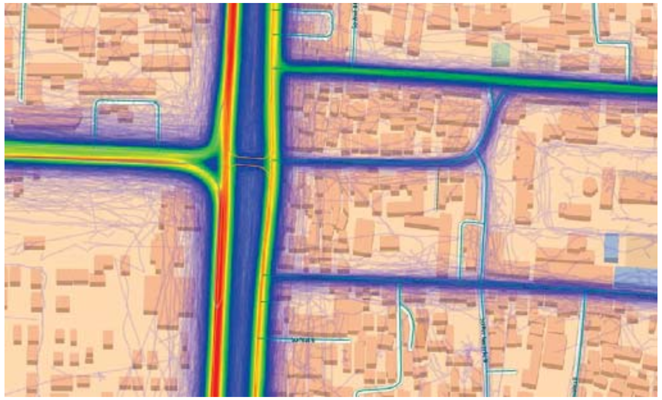
TOMTOM PROBE IN THAILAND

TOMTOM PROBE IN THAILAND



TOMTOM PROBE IN THAILAND

TOMTOM PROBE IN THAILAND



TOMTOM PROBE AS BASIS FOR DETECTION OF NEW GEOMETRY

TOMTOM PROBE AS BASIS FOR DETECTION OF NEW GEOMETRY

TOMTOM PROBE AS BASIS FOR DETECTION OF NEW GEOMETRY

TOMTOM PROBE AS BASIS FOR DETECTION OF NEW GEOMETRY

TOMTOM IS FOCUSING ON MAXIMIZING PROBE CAPABILITIES IN ORDER TO PUBLISH A HIGHLY ACCURATE MAP EFFICIENTLY

WITH ACCESS TO MORE SENSOR DATA, TOMTOM WILL CONTINUE TO DELIVER THE MOST UP-TO-DATE AND ACCURATE MAPS TO ENABLE

SMART MOBILITY

AUTONOMOUS DRIVING

THANK YOU.

Second Speaker of <Session 3D>

Assoc Prof.Dr. Matthew N. Dailey
Head, Department of Information and Communication Technologies,
Asian Institute of Technology (AIT), Thailand
E-mail: mdailey@ait.asia
Website :http://vgl-ait.org/mdailey

Brief Biography:

Education

2002.	*Ph.D., Computer Science and Cognitive Science, University of California, San Diego*
1992	*M.S., Computer Science, 1995; B.S., Computer Science,*

Honors,Awards,Grants

2014	*Best Paper Award, International Conference on Future Internet of Thingsand Cloud (Fi-Cloud)*
2009	*Best Reviewer Award, MIWAI*
2009 - 2010	*Royal Thai Government Joint Research Grant,*
2007 – 2008	*Royal Thai Government Joint Research Grant,*
2004 – 2006	*Thailand Research Fund post-doctoral research grant,*
2010	*Top-10 most-downloaded article in Neural Networks for 2003*
2001	*Powell Fellowship, UCSD*
1999	*ARCS Fellowship, UCSD*
1998	*Computer Science Teaching Excellence Award, UCSD*
1996	*Powell Fellowship, UCSD*
	Graduated Magna Cum Laude, NC State University
	Upsilon Pi Epsilon Computer Science Honor Society, NC State University

Video Analytics for Intelligent Transportation Systems
By Dr. Matthew N. DAILEY

Summary:

Third Speaker of <Session 3D>

Dr. Monsak Socharoentum
NECTEC, Ministry of Science and Technology, Thailand
E-mail:

Brief Biography:

After completing my bachelor's degree from Chaulalongkorn University, Thailand, he joined the national research institute (NECTEC; National Electronics and Computer Technology Center) as a research assistant. He also holds master degrees in Geo-informatics and a PhD in Information Sciences. His technical expertise are Geo-Informatics, data analytics, and traffic & traveler information systems.

He is a former deputy president of Thai ITS association (government affair).
His current research interest is centimeter-level precision GNSS receiver development.

Next Generation of Global Navigation Satellite System (GNSS) and its Application in ITS
By Dr. Monsak SOCHAROENTUM

Summary:

Global Navigation Satellite Systems (GNSS) is an essential positioning technology for ITS. The availability, reliability , and accuracy are increasing amazingly since 2000 which is the year that American GNSS is opened to the public. During the last 5 years, China, Europe, Japan, and India are aggressively developing and offering enhanced GNSS positioning service. To ITS communities, GNSS is a promising key enabling technology for next generation ITS applications.

In this presentation, key principles of high precision GNSS and its impact on global ITS's future is elaborated. Thailand current status of GNSS infrastructure is presented. Experiences and test results from pioneer researchers are discussed. The audience will gain a concrete perception of the GNSS advanced capability

Abstract:
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Brief biography:
After completing my bachelor's degree from Chaulalongkorn University, Thailand, he joined the national research institute (NECTEC; National Electronics and Computer Technology Center) as a research assistant. He also holds master degrees in Geo-informatics and a PhD in Information Sciences. His technical expertise are Geo-Informatics, data analytics, and traffic & traveler information systems.
He is a former deputy president of Thai ITS association (government affair).
His current research interest is centimeter-level precision GNSS receiver development.

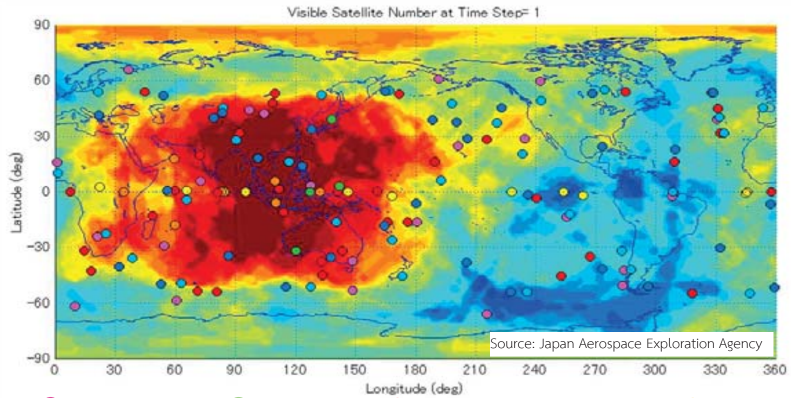
Topics

- Global competition on GNSS
- Current trend of GNSS positioning accuracy
  - Terrestrial and Satellite based Infrastructure
- Mobile phones Android with sub-meter accuracy
- Foresee the Future

Global competition on GNSS

1960	The first navigation satellite Transit (by the US)
1967	Timation satellite tried atomic clock for better accuracy of time measurement
1978 – 1985	11 GPS satellites were launched
1983	Russia shot Korean civil airplane Ronald Ragan decided to open GPS for civil usage so that the airplanes know where they are
1990-1991	Gulf war, the US army needs huge number of GPS receivers . The US government has no choice but buying receiver from the privates and temporary turn off the SA
1982	Russia launched its first GNSS satellites (GLONASS)
2011	First 2 Galileo were launched
2012 - present	China, India, and Japan are launching their GNSS satellites

Multi GNSS: Visible satellite number (mask angle 30 degrees)

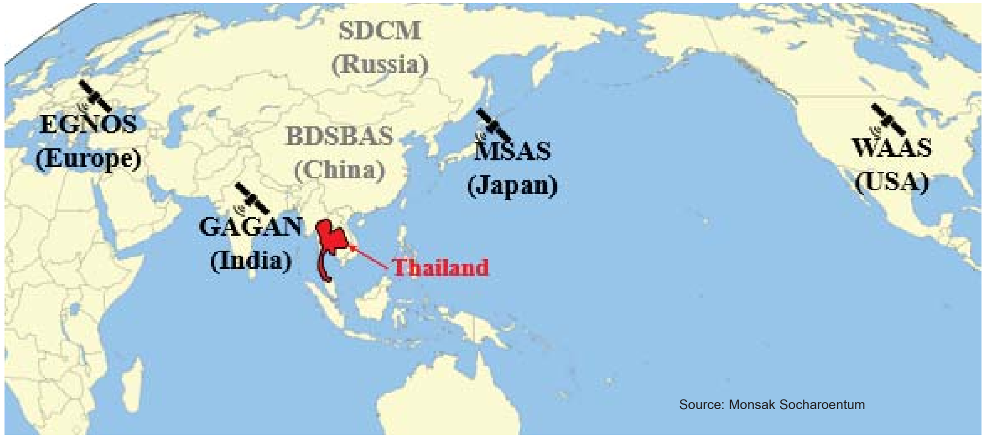


In 2020:

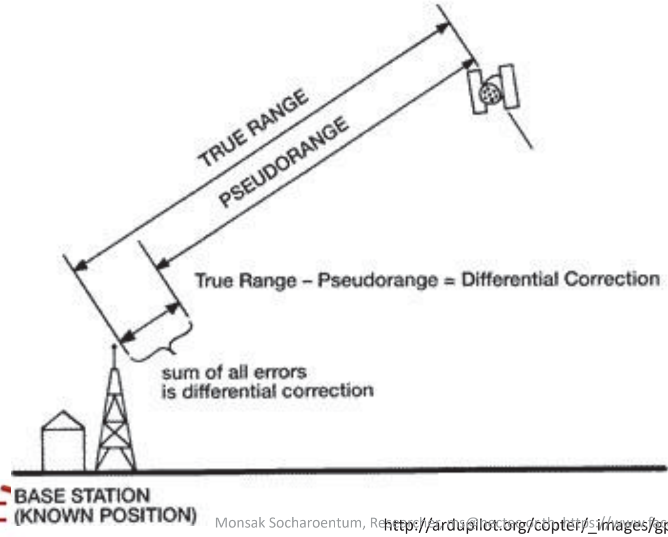
GPS(32)+ GLONASS(24)+ Galileo(30)+ BeiDou(35)+ QZSS(4)+ IRNSS(7)+ SBAS(13)

USA RUSSIA EU CHINA JAPAN INDIA

Satellite Based Augmentation System (SBAS)

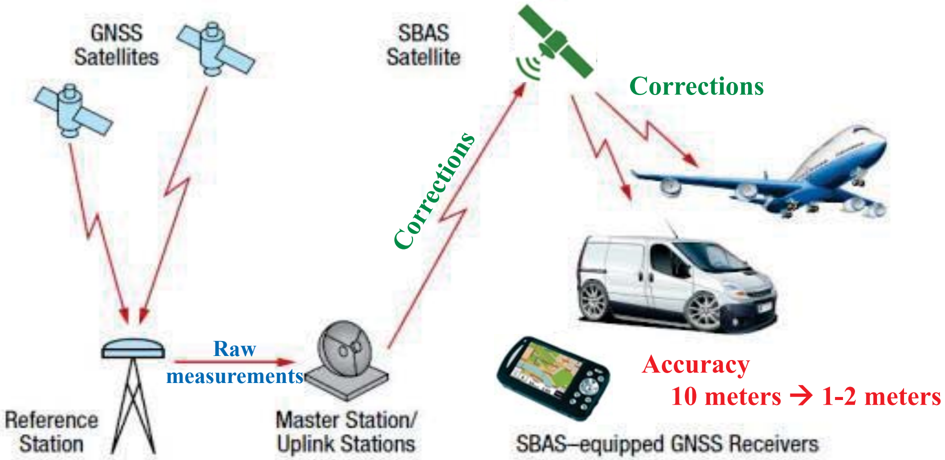


With SBAS: Positioning Accuracy 10 → 2 meters



http://ardupilot.org/copter/_images/gps_differential_corrections.jpg

With SBAS: Positioning Accuracy 10 → 2 meters



http://www.novatel.com/assets/images/_resampled/ResizedImage500279-SBAS-image.jpg

GNSS Receiver Specifications

GNSS Receivers	Huawei P7 L10 	Zenfone 2 ZE550ML 	iPhone 6S 	ublox M8N 
GNSS Constellations	GPS (USA) GLONASS (Russia)	GPS (USA) GLONASS (Russia) Beidou (China) QZSS (Japan)	GPS (USA) GLONASS (Russia)	GPS (USA) GLONASS (Russia) Beidou (China) QZSS (Japan)
SBAS	No	Yes	No	Yes

Reference Point Setup

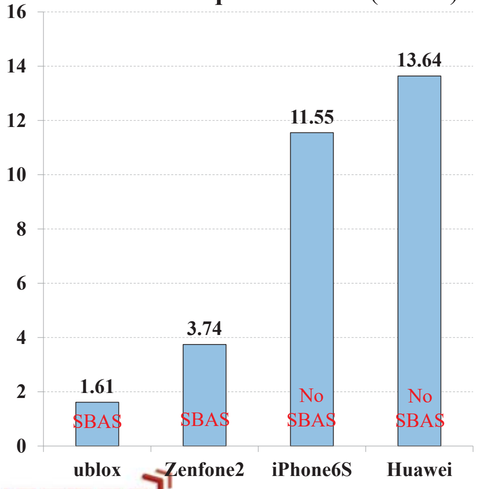
- Then all four receivers were placed on the top of the pole
- Data collection period was 10 minutes

Spacial thanks to

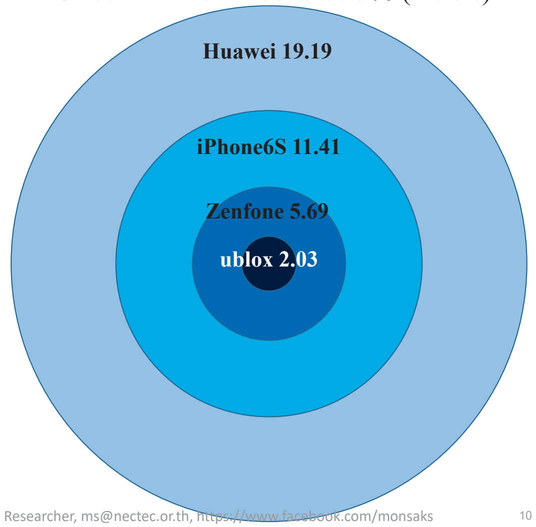
TOPCON Thailand
supports survey grade receivers

Department of Land, Thailand
supports RTK VRS account

Accuracy



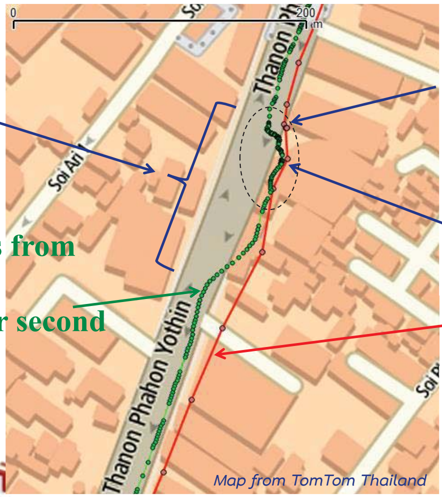
Precision



Bus arriving the stop

Sky train station (Ari, อารีย์)

Green line is from our device; 10 points per second

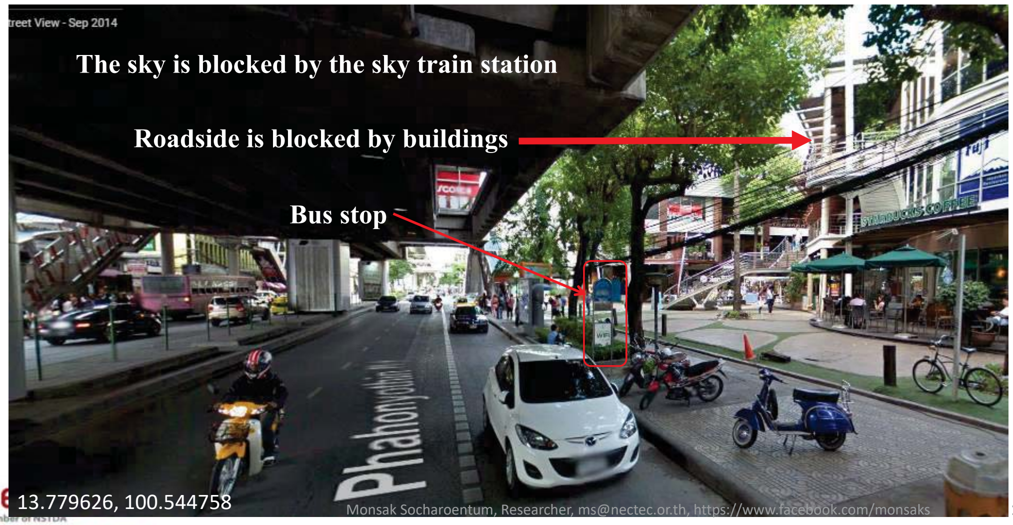


Point density increases as bus is slowing (approaching the bus stop)

Bus stop location

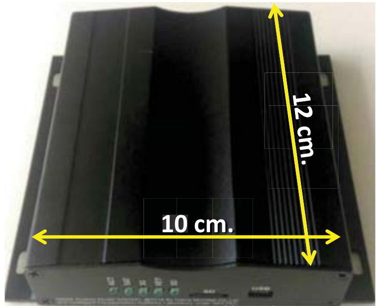
Red line is from a common GPS

The actual scenario



High definition vehicle tracking device

- Capture **5 positions per second** (best in the market is 1 position/second)
- Transfer positions real-time through 3G network
- Accuracy **2 meters** (under open sky; other common models are 10-15 meters)
- Better satellite availability
  - multiple constellations
  - GPS/QZSS + GLONASS
  - **GPS/QZSS + Beidou**
- Support memory card

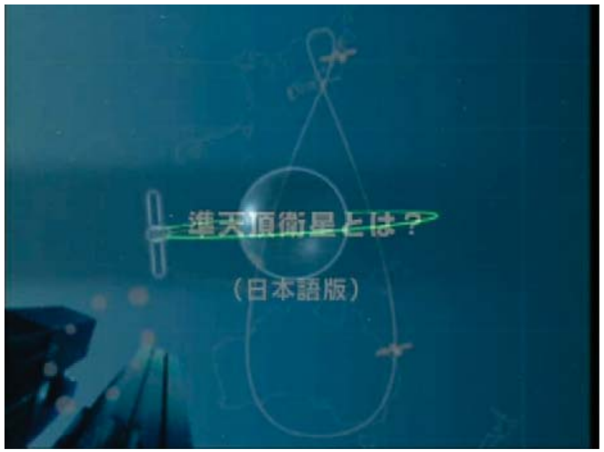


Animation

Huawei_P7 and Zenfone_2 are fixed but points still moving

https://www.youtube.com/watch?v=kp4ANyc7TKk

Many more SBAS to come



http://global.jaxa.jp/countdown/f18/overview/orbit_e.html

http://jda.jaxa.jp/result.php?lang=e&id=ebd2681298d2e7a219261859c6e0a775#

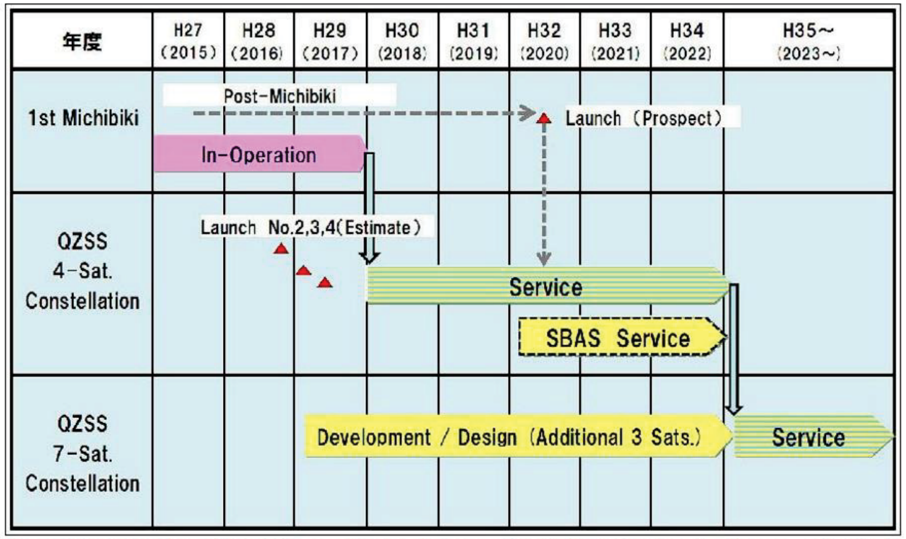
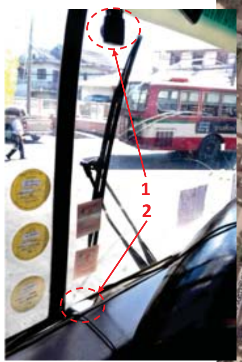


Figure 4: Update of the QZSS program schedule (image credit: PNT) Positioning, Navigation, and Timing https://directory.eoportal.org/web/eoportal/satellite-missions/q/qzss

BDSBAS - Design & Development Plan

- **Development Plan**
  - ✓ 2014: Evaluation of BDS augmentation performance.
  - ✓ 2014-2015: Participate in dual frequency multi-constellation SBAS standard establishment through ICAO, IWG etc.
  - ✓ 2018: Launch the first BDSBAS GEO satellite.
  - ✓ 2020: Finish the launch of 3 GEOs. Start to provide dual frequency multi-constellation SBAS service for China and surrounding areas users.
  - ✓ 2025: Provide augmentation service for larger areas users through international cooperation.

UniStrong 合众思壮 成为空间信息领域世界领先企业



Red: GPS + QZSS augmentation
Blue: Multi-GNSS w/o augmentation

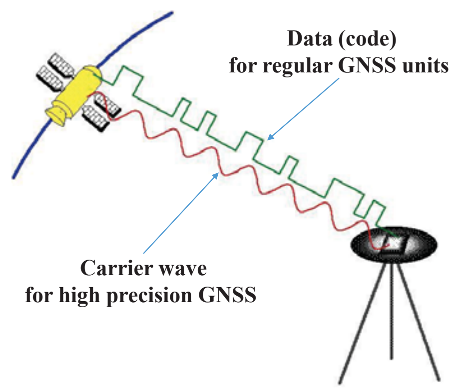
SBAS Timeline

2018
- China
  - First SBAS Satellite
- Japan
  - 4 QZSS satellites (3 IGSO + 1 GEO)

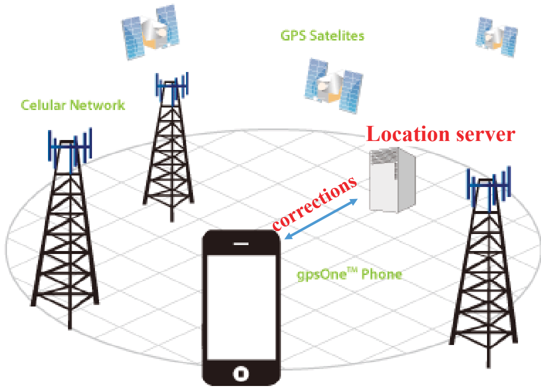
2020
- China
  - 3 GEOs and SBAS for China
  - 35 navigation satellites (global)

2023
- China
  - SBAS for Asia Pacific
- Japan
  - Operation of 7 QZSS satellites (4 IGSOs + 3 GEOs)
  - SBAS for Asia Pacific (3 GEOs)

Sub-meter level accuracy on Android phone



http://www.geologie.ens.fr/~vigny/images/gps-cours3.jpg

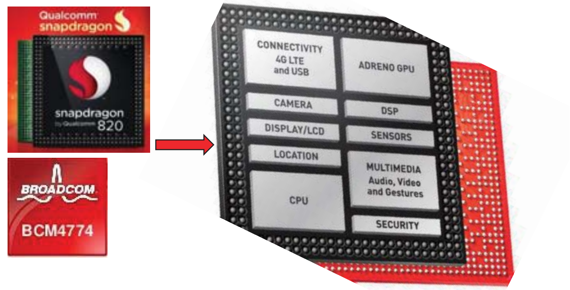


http://www.furuno.com/img/prev/en/markets/gnss/case/case_furuno02_img_002.gif

Sub-meter level accuracy on Android phone

Chips with the capabilities

- Qualcomm Snapdragon 650, 820
- Broadcom BCM 4774
- Intel WCS2x00



MWC 2017 - Android 7.0 Nougat best phones run-down

- Xiaomi Mi6
- LG G6
- Huawei P10
- Sony Xperia XZ Premium
- BlackBerry KeyOne

Developers DESIGN DEVELOP DISTRIBUTE

Reference

Android Platform API: O

android.location

Contains the framework API classes that define Android location-based and related services.

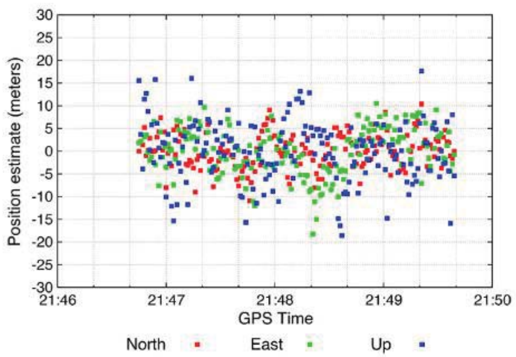
Not com.google.android.gms.location !

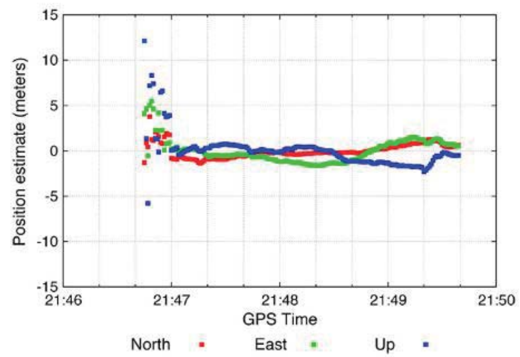
Classes

Address	A class representing an Address, i.e, a set of Strings describing a location.
Criteria	A class indicating the application criteria for selecting a location provider.
Geocoder	A class for handling geocoding and reverse geocoding.
GnssClock	A class containing a GPS clock timestamp.
GnssMeasurement	A class representing a GNSS satellite measurement, containing raw and computed information.
GnssMeasurementsEvent	A class implementing a container for data associated with a measurement event.
GnssMeasurementsEvent.Callback	Used for receiving GNSS satellite measurements from the GNSS engine.
GnssNavigationMessage	A class containing a GNSS satellite Navigation Message.
GnssNavigationMessage.Callback	Used for receiving GNSS satellite Navigation Messages from the GNSS engine.
GnssStatus	This class represents the current state of the GNSS engine.
GnssStatus.Callback	Used for receiving notifications when GNSS events happen.

https://developer.android.com/reference/android/location/package-summary.html

With and without corrections



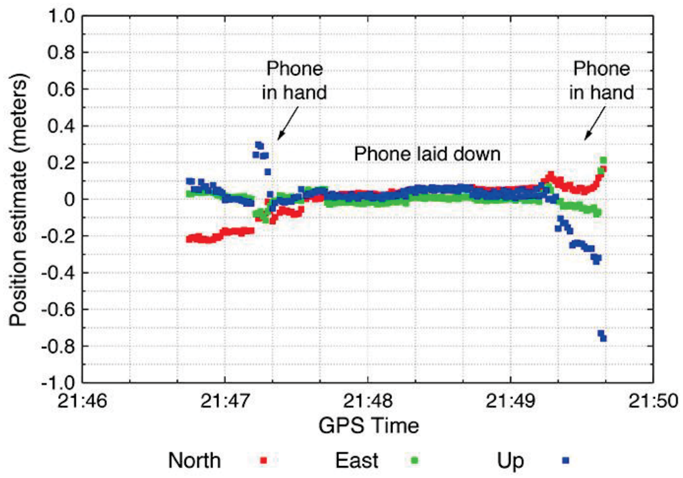


Remark: Precise satellite orbit and clock corrections computed at Natural Resources Canada (NRCan)

Richard B. Langley

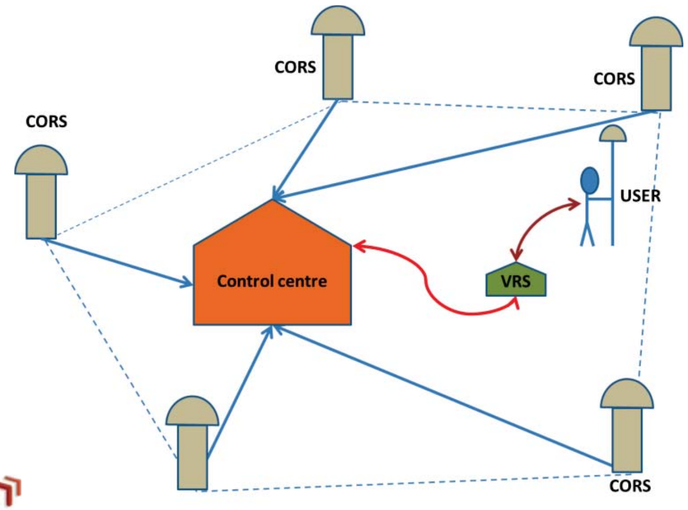
http://gpsworld.com/innovation-precise-positioning-using-raw-gps-measurements-from-android-smartphones/

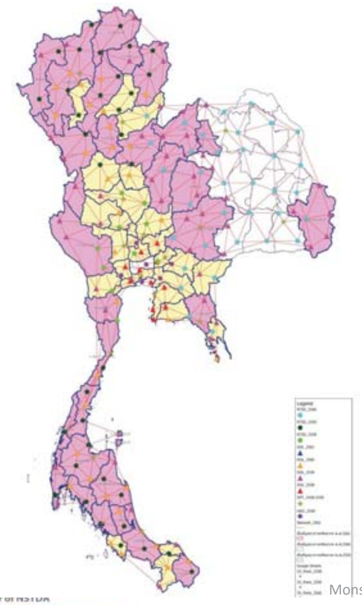
Position differences



http://gpsworld.com/innovation-precise-positioning-using-raw-gps-measurements-from-android-smartphones/ Richard B. Langley

With RTK: Positioning Accuracy → centimeter level

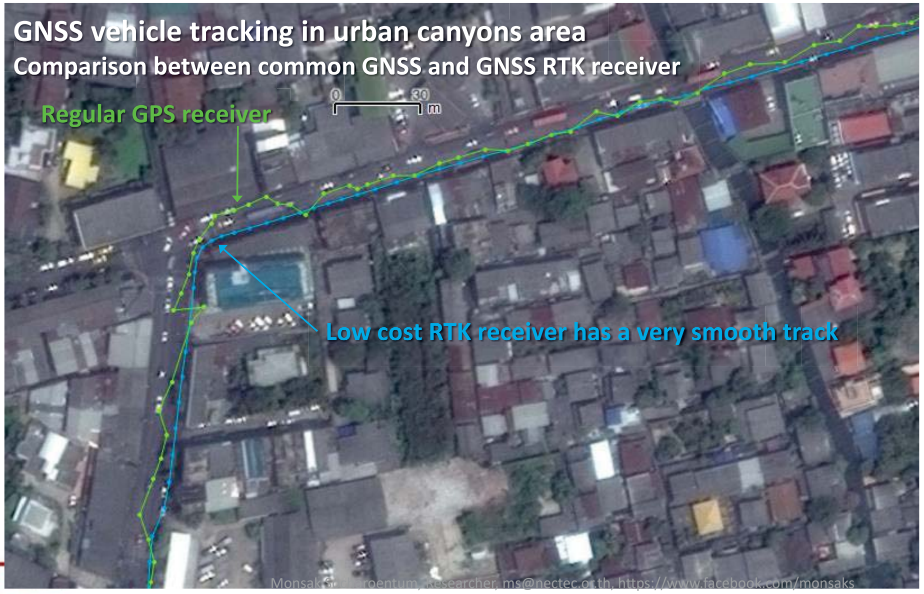




GNSS RTK service coverage by the Department of Land

End of 2016 (purple) 30 provinces

End of 2017 (yellow) 29 provinces



Foresee the Future

Example Enhanced ITS Applications

- Navigation; Turn-by-turn → Lane level navigation
- Pedestrian navigation for blinds
- Road safety
  - Illegal lane occupation (truck driving on right lane)
  - Over speed detection (lane level)
  - Enhanced road accident analysis (with high precision GNSS tracker)
- Autonomous vehicles: cars, ships, drones, robots

High Precision and High Definition Map

- Single line road → Lanes with attributes
- Enhanced sidewalk map and entrances
- 2D map → 3D hi-def map
- Detailed locations of infrastructures: fire hydrant, ATM, etc.

Thank you

Please follow me on Facebook
https://www.facebook.com/monsaks

Fourth Speaker of <Session 3D>

Asst.Prof.Dr. Paramet LUATHEP
At Civil Engineering, Faculty of Engineering,
Prince of Songkla University, Thailand
E-mail:paramet007@hotmail.com

Brief Biography:

Dr Paramet Luathep is an Assistant Professor at Civil Engineering, Faculty of Engineering, Prince of Songkla University. He obtained his first degree in Civil Engineering with First Class Honor from King Mongkut's Institute for Technology Latkrabang. He then graduated M.Eng in Transportation Engineering from Asian Institute of Technology (AIT) where he also received a prestigeous Barbara John Hughes Prize for the most oustanding graduate from the Master degree. After doing the road safety research at the Thailand Accident Research Center (TARC) at AIT for two years. He pursued his PhD in Transportation Engineering at the Hong Kong Polytechnic University.

His current research areas are, for example, road safety, transport network analysis, transport planning.

ATRANS SAFETY MAP: Mobile Application for Mapping Black Spot Locations

By Asst.Prof.Dr. Paramet LUATHEP

Summary

The presentation will introduce the problem of road safety situation in Thailand and the gaps for mapping the black spot locations on the road network. The ATRANS Safety Map application is then presented. The process of application development and implementation are described. The functions for mapping black spot location using smartphone technology are also highlighted. Initial results of the application implementation in Songkhla (Hat Yai), Suphanburi and Phuket are illustrated. Further works for the application improvement are also highlighted.

ATRANS

Our Soul is for the Benefit of Mankind

ATRANS Safety Map: Mobile Application for Mapping Black Spot Locations

Asst.Prof.Dr. Paramet Luathep
Prince of Songkla University

Outline of the presentation

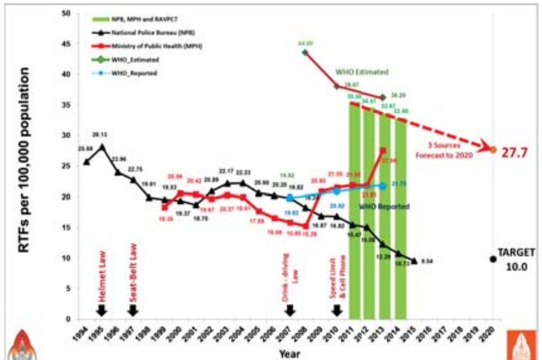
ATRANS

- Introduction
- Research objectives
- Safety map application
- Results
- Further works

Introduction

ATRANS

- UN proclaimed the Decade of Action for Road Safety 2011-2020 and urges member countries to give priority to road safety issues.
- Thailand was ranked the second highest road traffic fatality rate in the world at 36.2 per 100,000 (WHO, 2015).



Source: Assoc.Prof.Dr. Pongrid Krungboonklong

Introduction (Cont.)

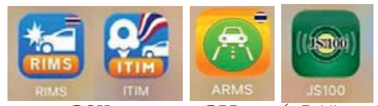
ATRANS

- Development of road safety databases/maps is one of the key steps for safety professionals
  - to understand the bottom of the issues
  - to efficiently propose measures and actions to correct the safety problems.
- Several databases and applications have been proposed.
- Public participation for road safety

Web-based applications

Smartphone-based applications

Local road?



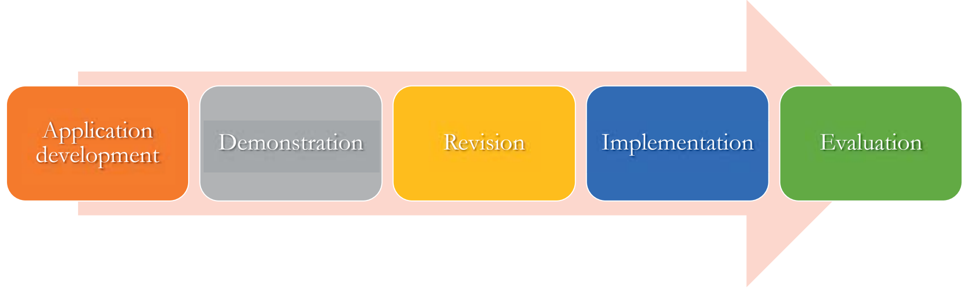
DOH DRR ✓ Public participation

Goal of the research

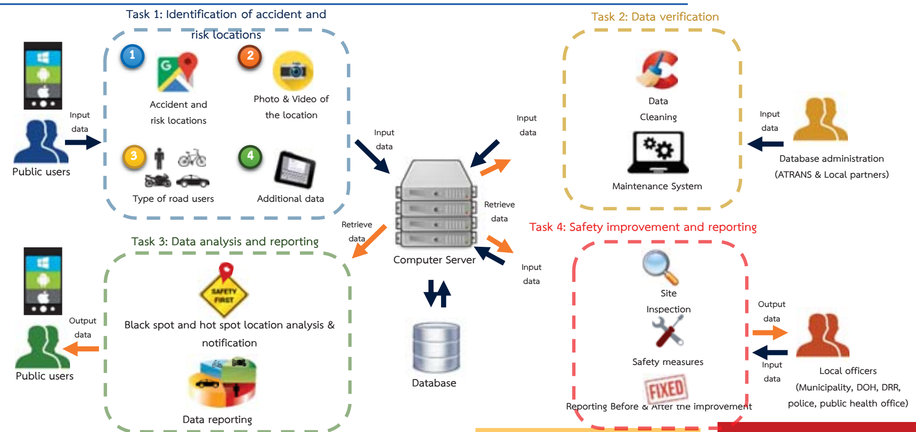
To propose an effective mobile application for mapping black spot location.

- The application
  - allows **anyone** to easily access and perceive accident information
    - Use for daily travel/national holidays (new year, Songkran)
  - allows the **local authorities** to use the collected data in order to solve and prevent the road traffic accident problem
    - Identification of black spot locations (passive)
    - Implementation of road safety audit (active)

Research framework



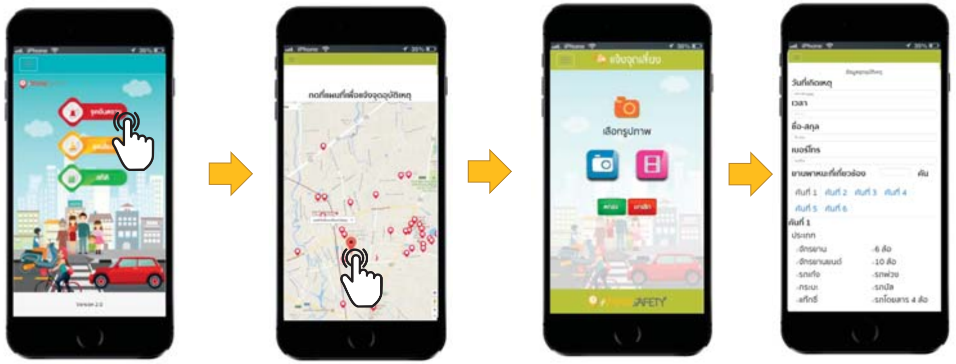
Task 1: Application development



Application development (Cont.)

- 3 main functions:
  - ✓Identify accident location
  - ✓Identify risk location
  - ✓Report the data

Identify accident location (1)



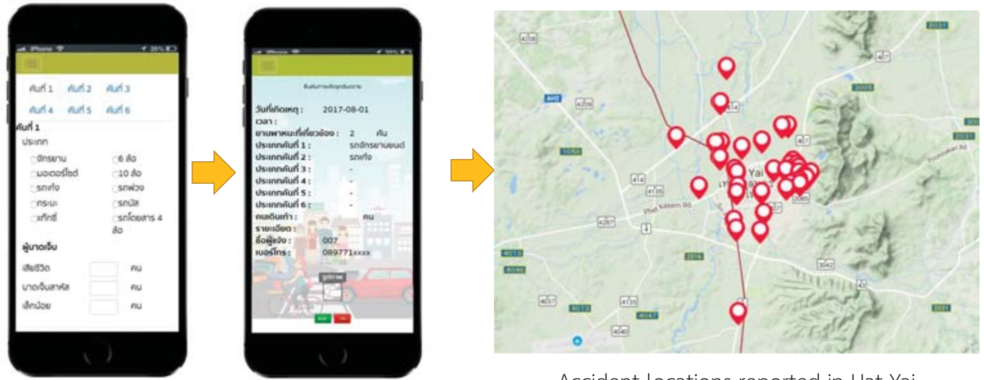
Select the menu

Touch to identify the location

Upload photo

Fill up accident data Date & time

Identify accident location (2)



Vehicle & road victim data

Case summary

Accident locations reported in Hat Yai

Identify risk location (1)

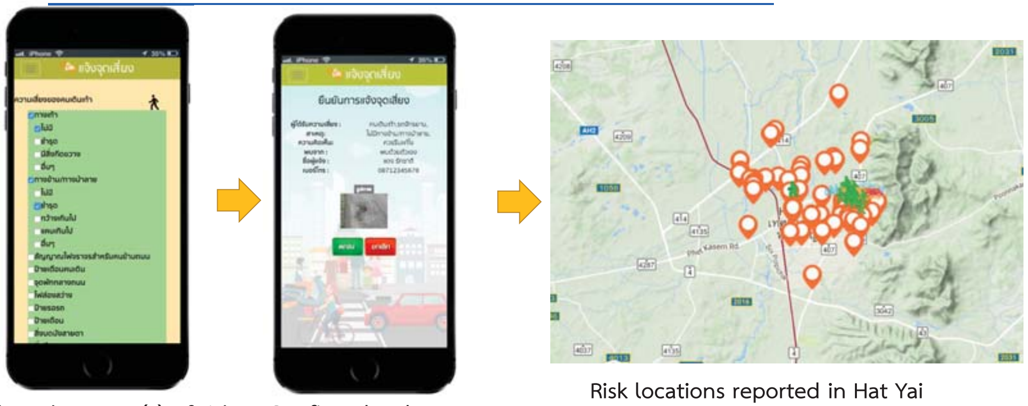
Select the menu

Touch to identify the location

Upload photo

Select the risk user(s)

Identify Hiyari location (2)

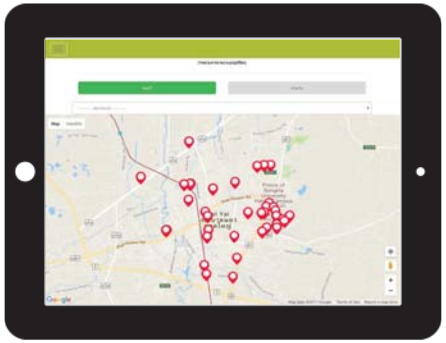


Select the cause(s) of risk

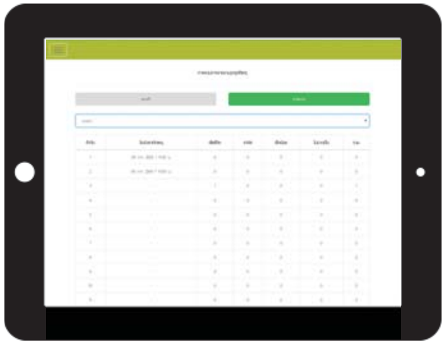
Confirm the data

Risk locations reported in Hat Yai

Reporting accident locations



Accident map

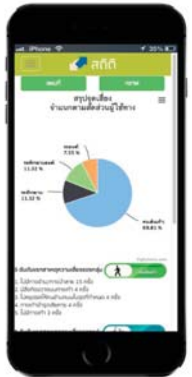


Accident report

Reporting risk locations

All risk locations reported

Risk locations filtered by road users



Risk factors classified by road users

Top 5 risk factors

Identifying black spot locations (1)

- Random accident and risk locations (Latitude & Longitude) reported by users will be clustered by using Google Map APIs and clustering function.

Random locations

Latitude	Longitude
13.7501506	100.5210198
13.73961209	100.5707265
19.84597514	99.86634862
18.78405324	99.00512584

Latitude & Longitude data

Pin location

Cluster locations

Source: Google Maps APIs, Marker Clustering (https://developers.google.com/maps)

Identifying black spot locations (2)

- The black spot locations can be identified using

Accident Frequency Method

Section	Black spot location
Straight	> 4 accident per year
3-legs junction	> 5 accident per year
4-legs junction	> 6 accident per year
5-legs junction	> 4 accident per year
Others junction	> 5 accident per year
Curve	> 3 accident per year
Bridge	> 4 accident per year

Source: OTP (2013) Black Spot Treatment Workshop

Accident Cost Method

Economic loss = a (No. Fatalities) + b (No. Disables) + c (No. Injuries) + property damage costs

where

a is the economic loss per fatality = 5,315,556 baht

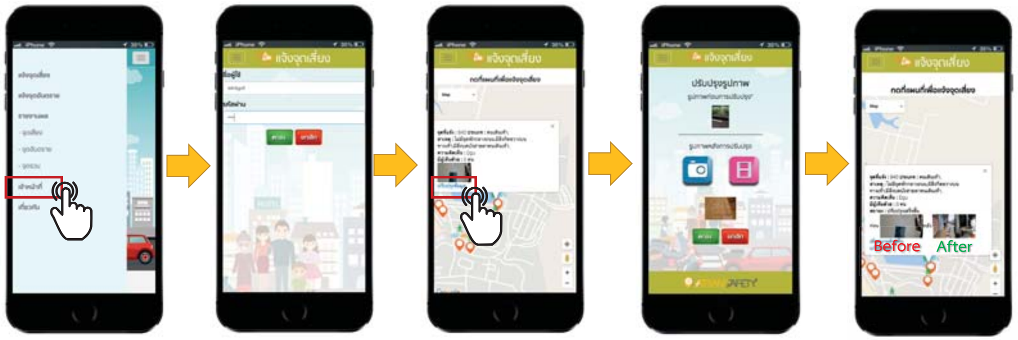
b is the economic loss per disable = 6,167,061 baht

c is the economic loss per injury = 147,023 baht

d is the economic loss per fatality = 45,898 baht

Source: DOH (2007) The Study of Economic Losses due to Road Crash

Safety improvement (before and after improvement)



Staff menu | User verification | Select the location and edit data | Upload the photo after the improvement

Task 2: Demonstration (road safety related authorities)

Khon Kaen (14 November 2014) | Ministry of Transport (19 May 2017) | Chiang Mai ODPC (14 June 2017)

Hat Yai (4 December 2014) | Chiang Mai (15 June 2017)

Hat Yai (14 January 2015) | Patong (26 June 2017) | Khon Kaen (9 June 2017)

Task 2: Demonstration (local road authorities)

Traffic division, Hat Yai Municipality
(15 June 2017)

Songkhla Highway District
(15 June 2017)

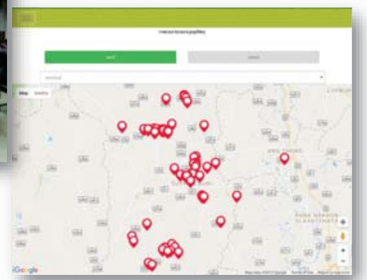
Task 2: Demonstration (students and staff in the universities)

Task 3: Revision (July-August)

- Final revision for the implementation

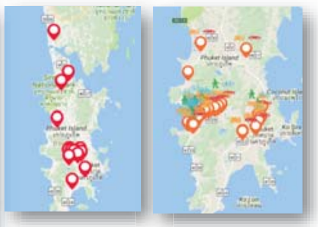
Task 4: Implementation
(Suphanburi Provincial Police)

- ✓ Conducted on 6 July 2017
- ✓ 70 staffs attended



Task 4: Implementation
(Phuket Provincial Police)

- ✓ Conducted on 11 August 2017
- ✓ 31 staffs attended



Task 4: Implementation
(National level)

Task 5: Evaluation

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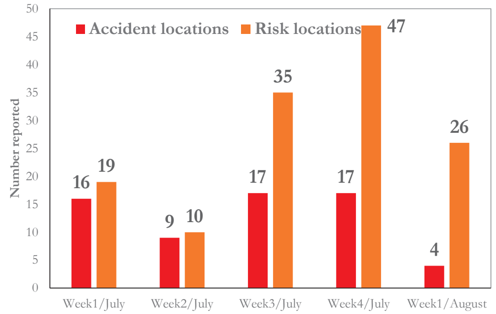
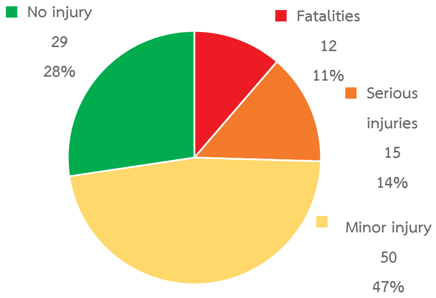


Number of accidents and risk locations



Number of casualties

Task 5: Evaluation

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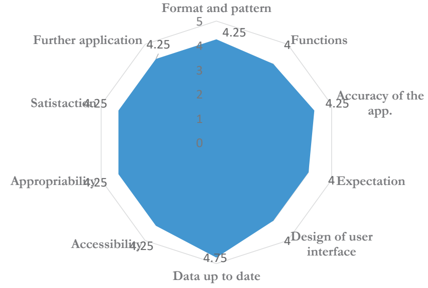
Satisfaction survey (on line)



Further works

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- Improve and develop some features
  - ✓English version
  - ✓User verification (username and password)
  - ✓real-time accident notification
- Evaluate the success of the project
  - ✓Quantity
    - o No. accidents and risk locations reported
    - o No. staff and users trained
    - o No. locations for safety improvement
  - ✓Quality
    - o Questionnaire survey (key persons)
- Assess the maintenance cost

ATRANSAFETY

ATRANS Asian Transportation Research Society

Thank you for your attention

< Closing Remark >

Closing Remark
By Mr. Chamroon Tangpaisalkit, ATRANS Chairperson

Closing Remarks

By Mr. Chamroon Tangpaisalkit, ATRANS Chairperson

Distinguished guests, Delegates, Ladies and gentlemen,

The 10th ATRANS Annual Conference has come to its inevitable conclusion. I would like to express my heartfelt thanks to you for taking your precious time joining our ATRANS Annual Conference on "Transportation for a Better Life: Mobility and Road Safety Managements." I am certain that these issues will be continued on until its implemented year.

I am overwhelmed by your enthusiastic participation today. More than **200** participants from across the nation and overseas have taken part in this International Academic Event.

Briefly looking back from today's sessions:

The first Panel Discussion was, I believe, a good opportunity to share various perspectives on "Mobility and Road Safety Managements."

As for the Parallel Sessions, I believe we were able to broaden and deepen our knowledge about Smart Mobility particularly, on Transport Infrastructure and Transit Oriented Development. Not to mentioned Logistics and Disaster Management as well as Transport Safety and Transportation and Environmental related issues which are the key challenging issues that we have been confronting for many years. Utilization of technology through Intelligent Transportation System or ITS will enable us to mitigate and to conveniently access to information and public transportation.

In addition, I hope you also enjoyed listening to the young researcher and student paper presentations in the Young Researcher's Forum.

I also would like to congratulate those whose papers and presentations were selected as the Best Paper and Presentation Award. Your hard works are finally paid off. Congratulations once again.

In closing today's conference, I would like to express my sincere thanks to you once again for your participation and cooperation in making this event such a real success.

We sincerely ask for your continual support and collaboration in the future so that ATRANS can continue doing its best to serve and to contribute to our mobile society in the Asian region and beyond.

To our foreign guests and participants, we hope you have a pleasant stay here in Bangkok. Please enjoy your time and make your trip a memorable one.

We look forward to meeting you again in the 11th ATRANS Conference next year. Thank you very much.

END