2nd Asia Automobile Institute Summit

25-26 November 2013, Bali

Traffic Safety /Motorcycle Safety Session

Chairmen:
- **Prof. Danardono, UI**
- **Dr. Ario Sunar Baskoro**
- **Mr. Ganesha Tri Chandrasa, BPPT**
- **Mr. Osamu Takatori, JARI**

Agenda

1. Opening remark, chairman < 25 (minutes) Overview of Traffic Accident in Indonesia (Prof.Danardono)

2. Presentation by JARI (25 minutes, including Q&A)
For realization of traffic safety - What should we do first? -

3. Presentations by ARAI (25 minutes, including Q&A)
Two wheeler safety in India

4. Presentations by MIROS (25 minutes, including Q&A)

5. Presentations by TAI (25 minutes, including Q&A)????

For realization of traffic safety

- What should we do first? -

Osamu TAKATORI
JARI Safety Research Dev.

Contents

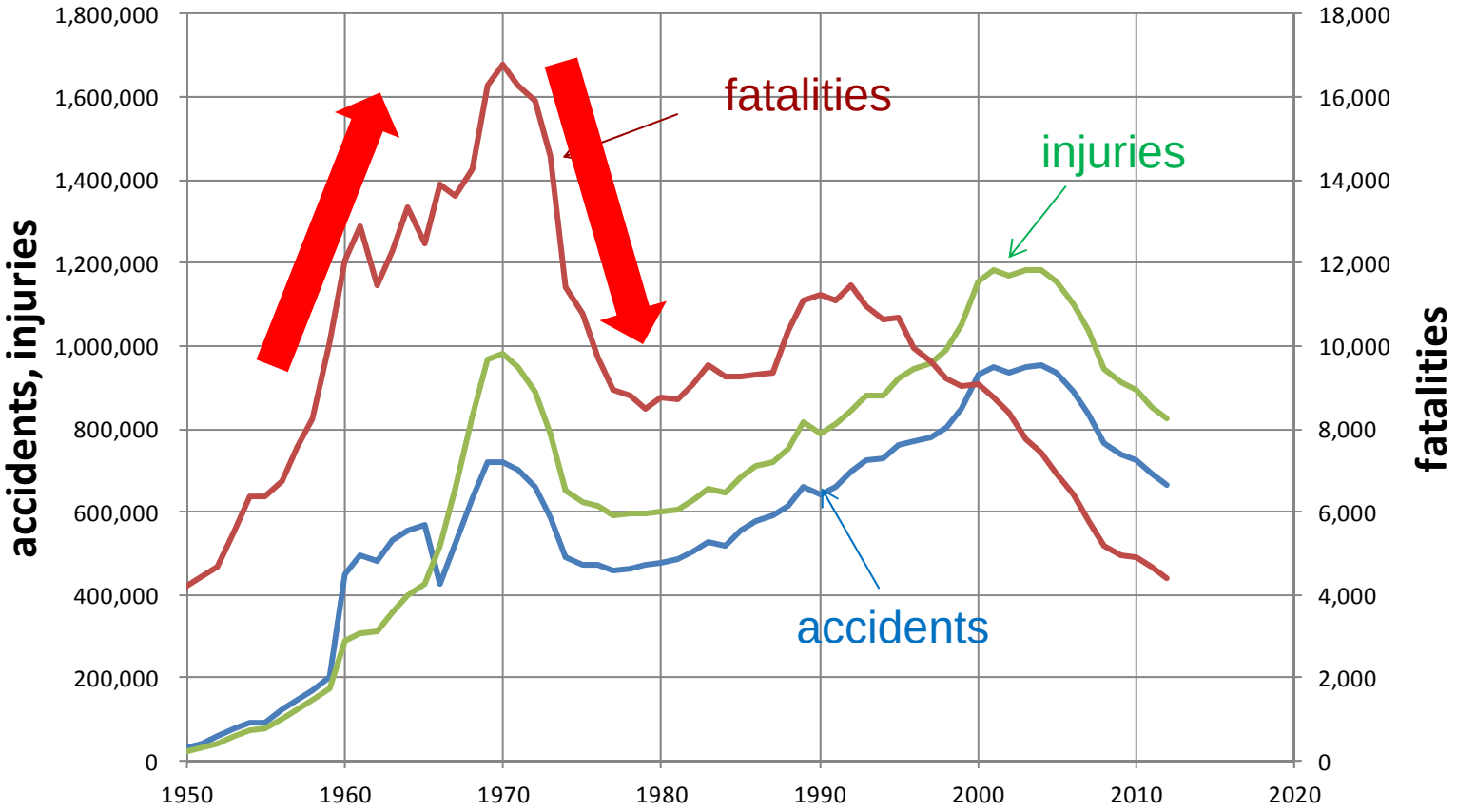
1. Review of Japanese accident data
2. Accidents of motorcycles in Japan
3. General approach towards safety measures
4. An example of accident data analysis and safety measures

    Pedestrian safety

5. Conclusion

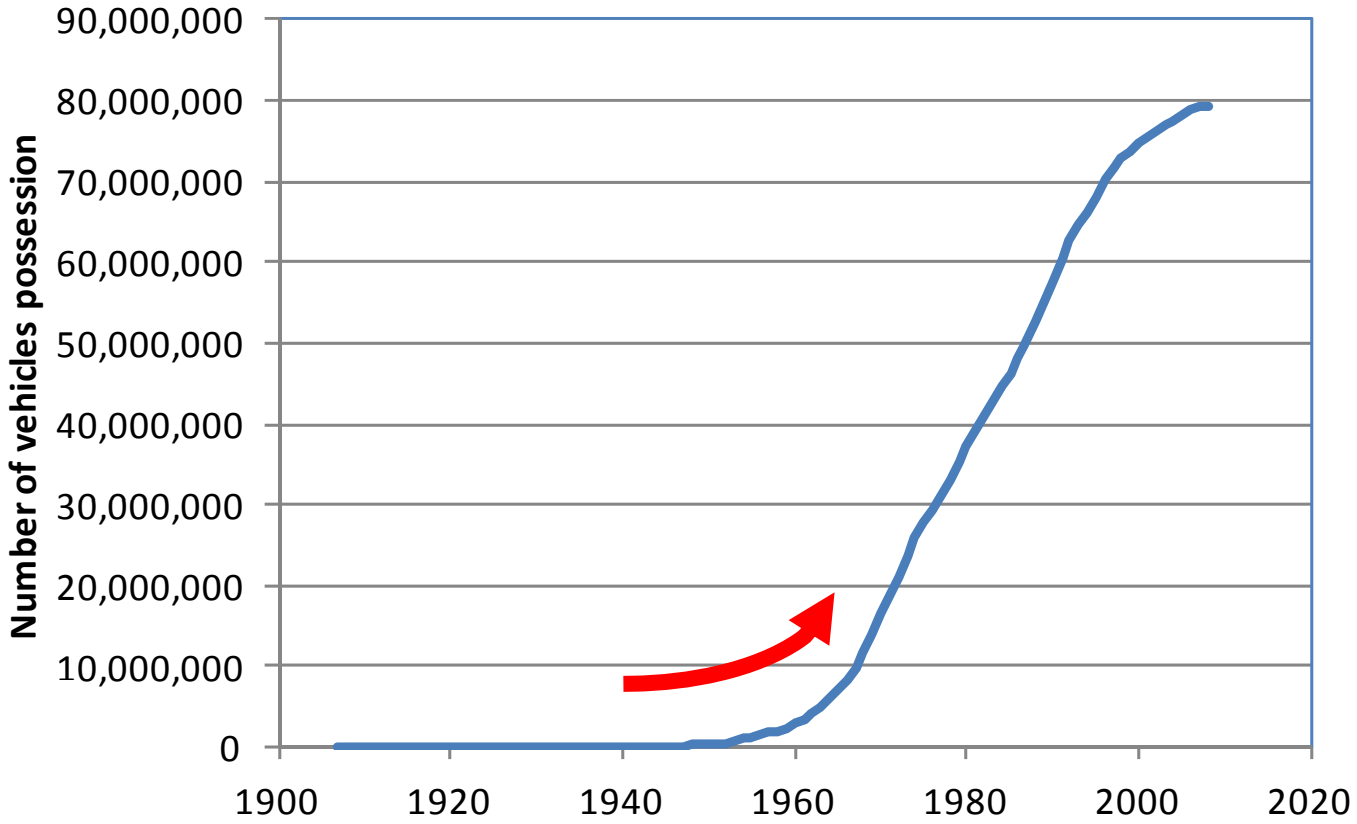
1. Review of Japanese accident data

Annual transition of accidents in Japan



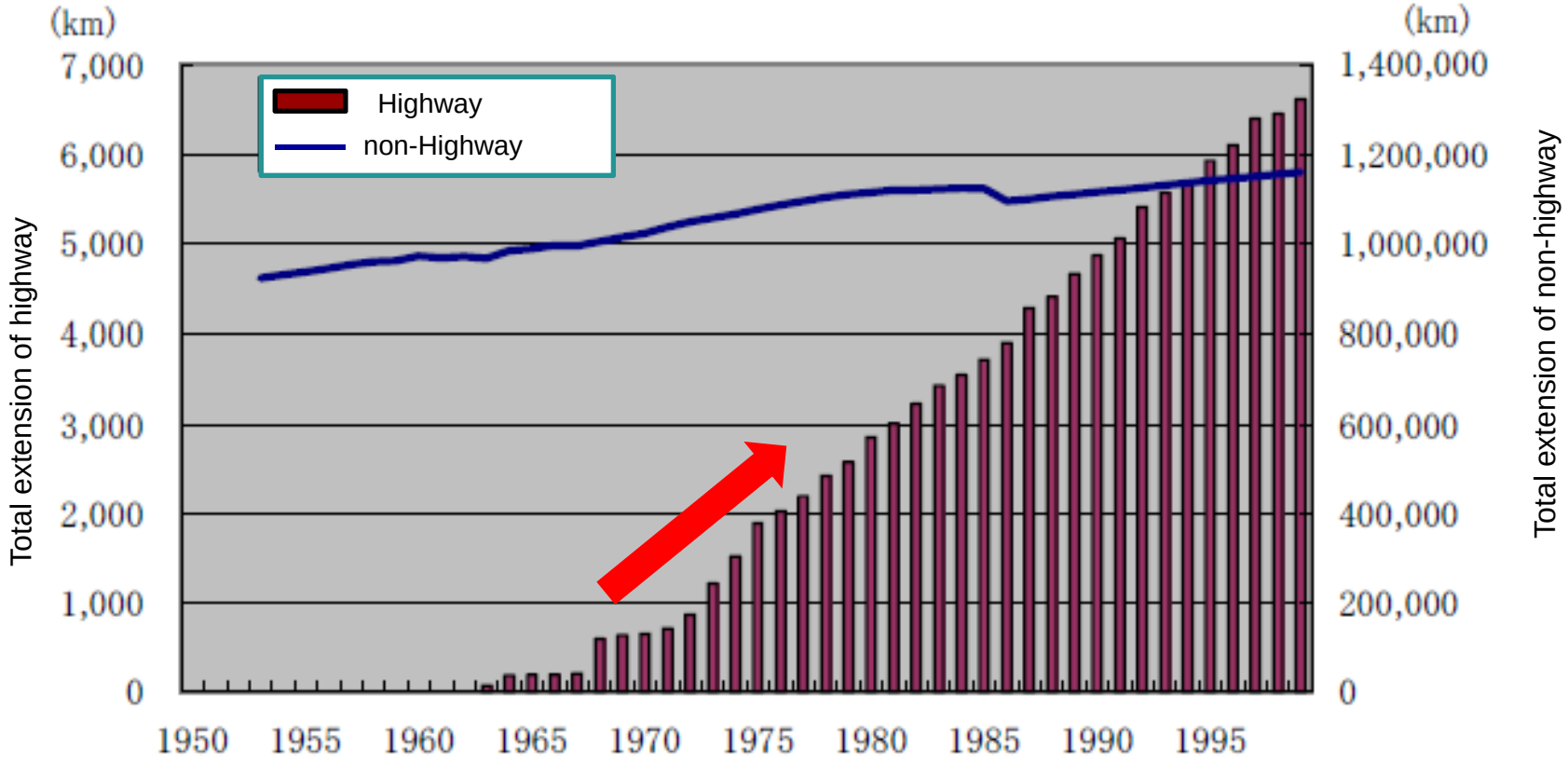
Reference: National Police Agency website

Number of vehicles in use in Japan



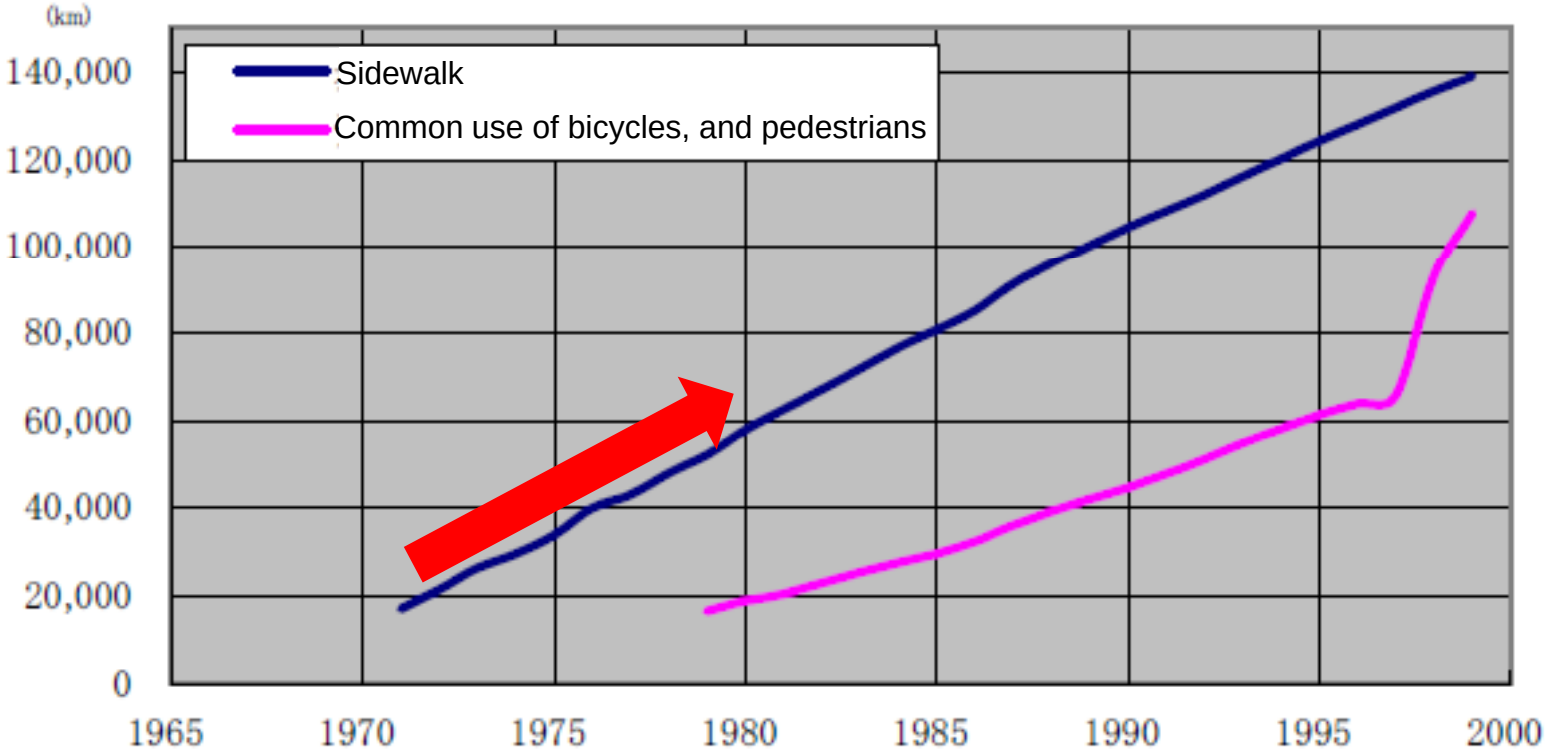
Reference: Ministry of Land, Infrastructure, Transport and Tourism website

Road traffic infrastructure 1



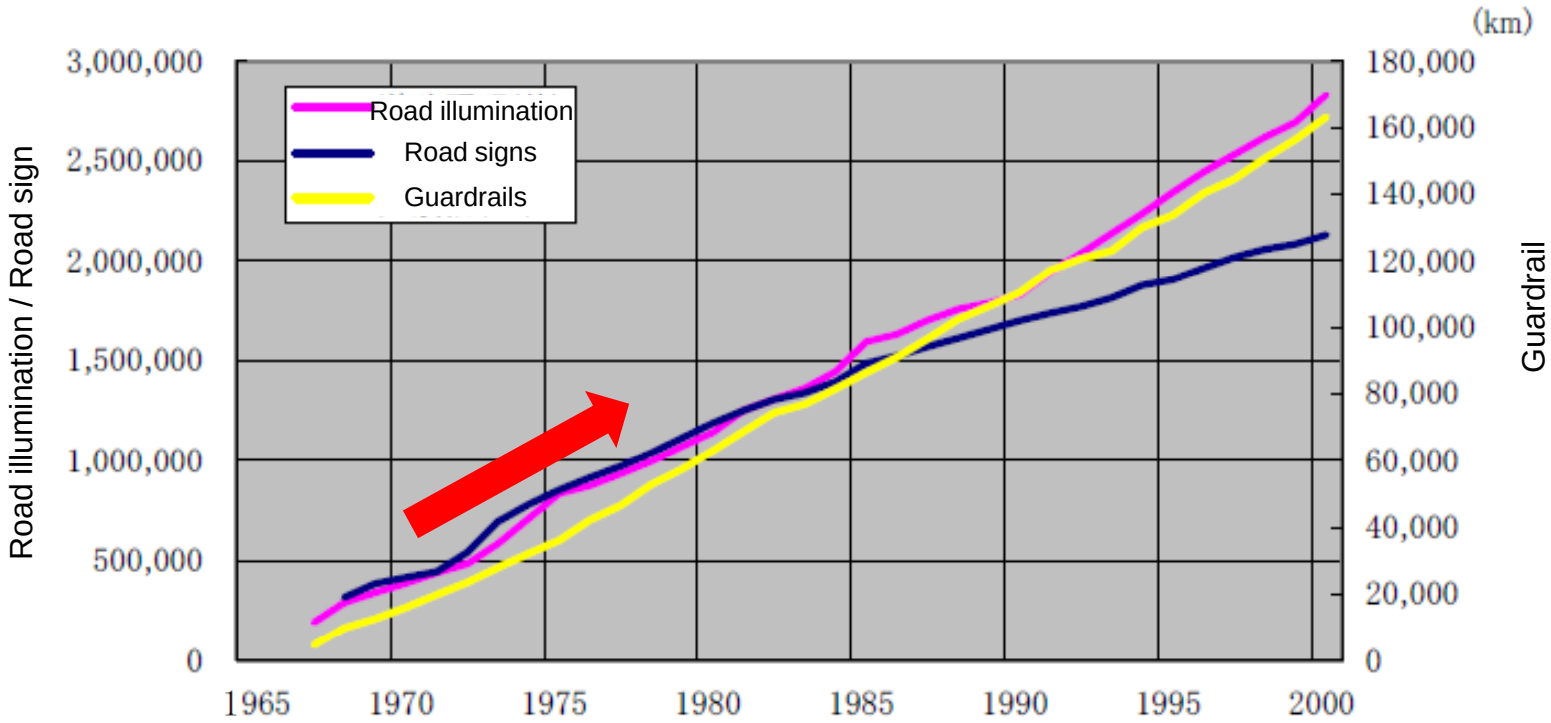
Reference: Ministry of Land, Infrastructure, Transport and Tourism website

Road traffic infrastructure 2



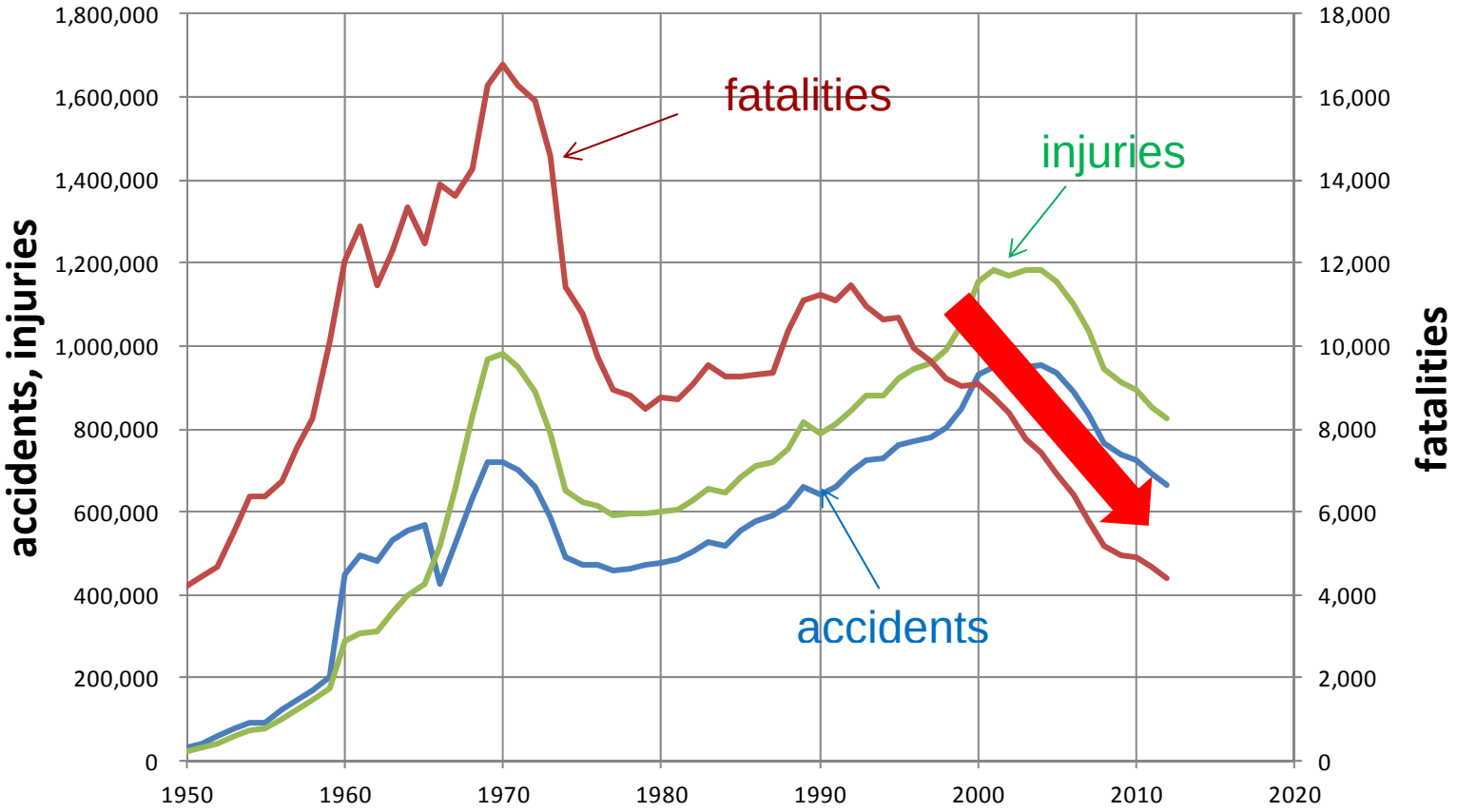
Reference: Ministry of Land, Infrastructure, Transport and Tourism website

Road traffic infrastructure 3



Reference: Ministry of Land, Infrastructure, Transport and Tourism website

Annual transition of accidents in Japan



Reference: National Police Agency website

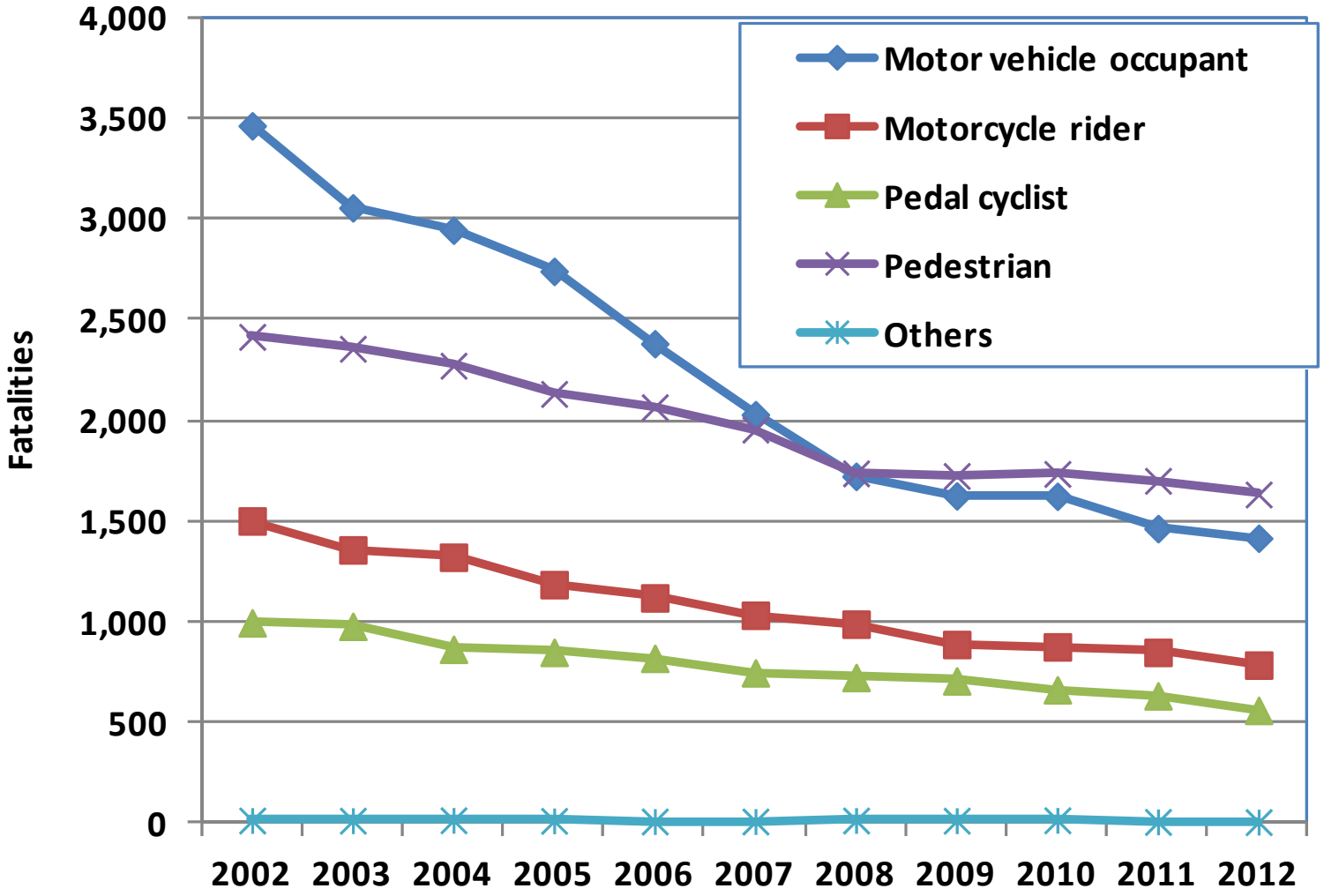
Reduction in deaths after implementing vehicle safety measures

	The reduction of deaths within 30 days 1999 to 2009
Full frontal crash	1,428
Side impact	364
Offset frontal crash Pedestrian head protection	179
Others	6
Total	1,977 less deaths

Reference: Ministry of Land, Infrastructure, Transport and Tourism
Council of Transport Policy Report 2011

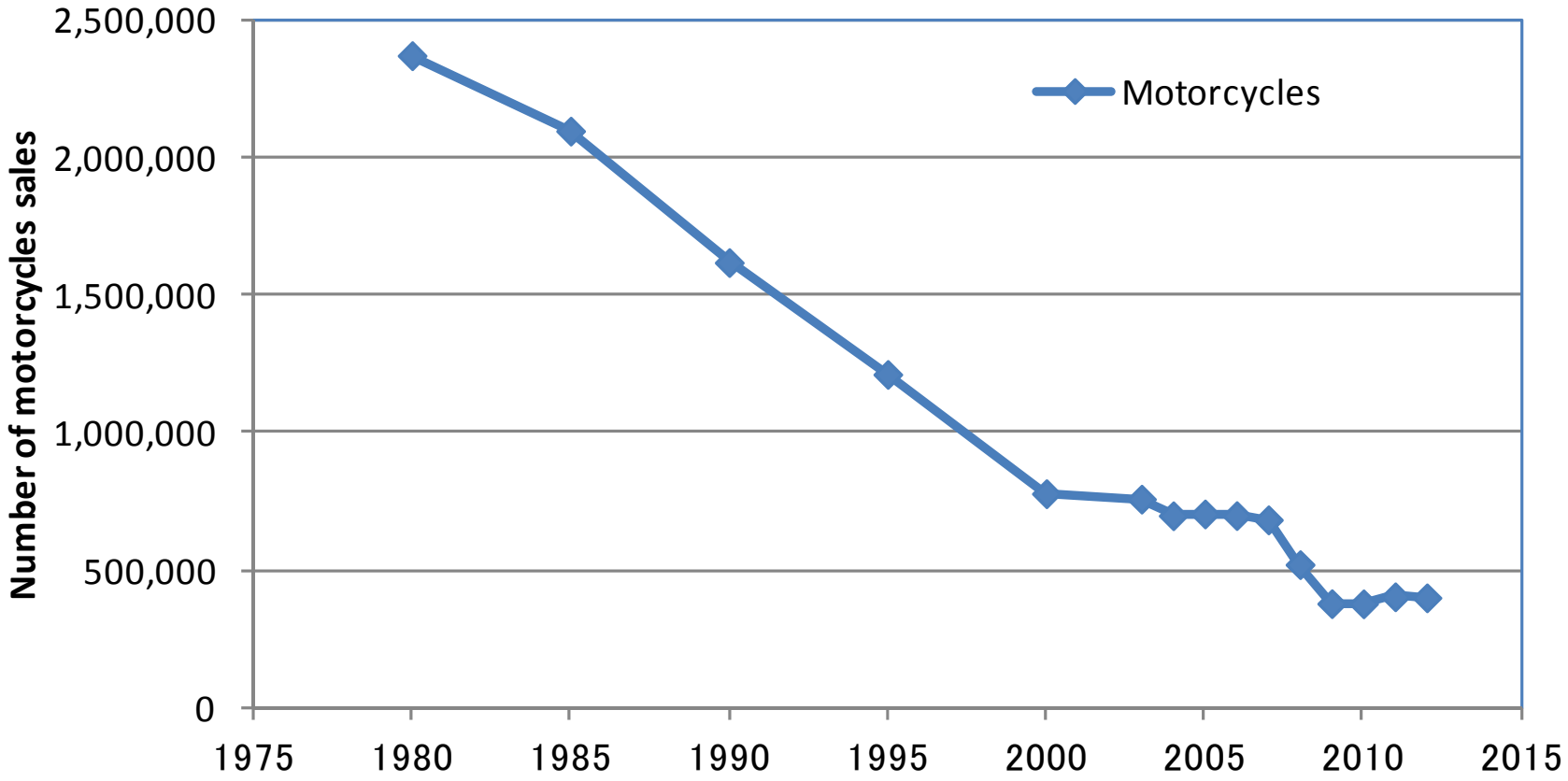
2. Accidents of motorcycles

Fatalities according to type



Reference: National Police Agency website

Number of motorcycles sales



Reference: Japan Automobile Manufacturers Association, Inc. website

Measures for accidents of motorcycles in Japan

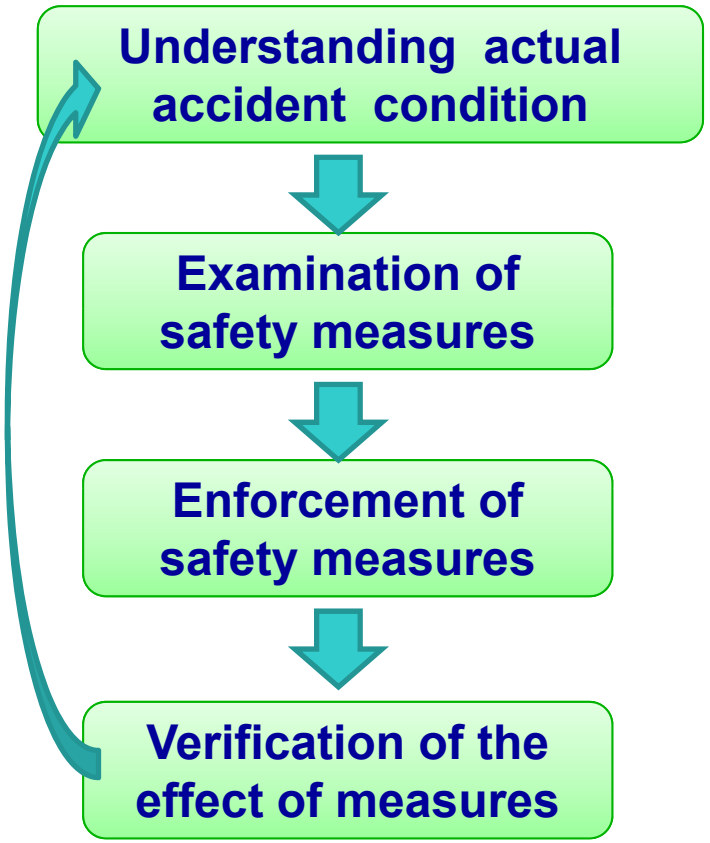
- In Japan, concrete measures have not been established because motorcycle accidents show a downward trend, and because of difficulty and cost in installing any measures

3. General approach towards safety measures

"What should we do first?"

- What has happened?
- In what quantity?
- Why has it happened?

For effective measures



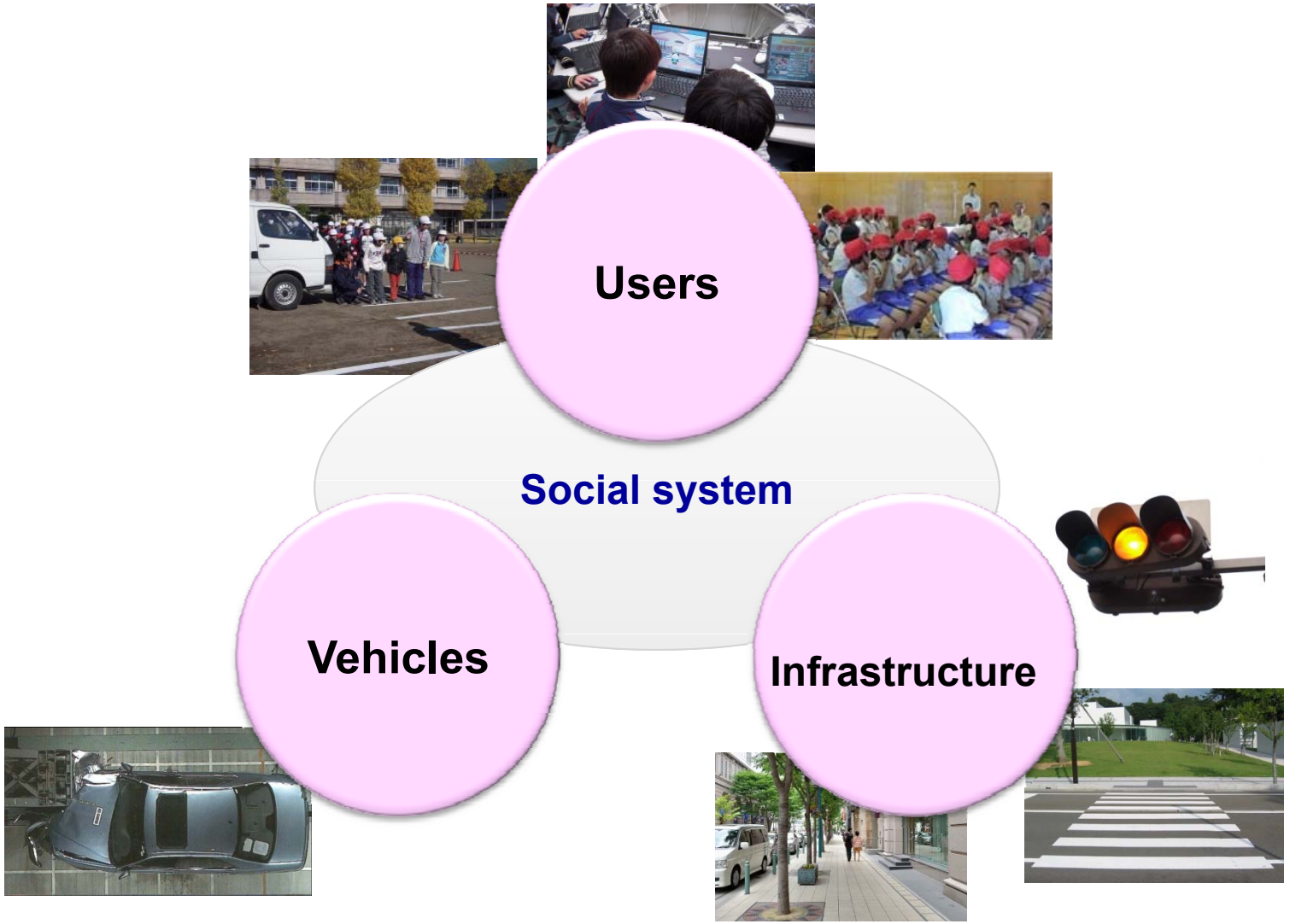
1. The actual conditions of accidents are investigated.

2. The effects in advance are predicted. Effective measures are chosen based on the results.

3. Selected safety measures are implemented.

4. It is checked whether the expected effect is acquired.

3 elements of traffic accidents



Accident database in Japan

- Traffic accidents database (J-TAD)
  - Macro DB

    Investigation for all the accidents resulting in injury or death which occur in Japan (0.7 Million accidents per year)
  - Micro DB

    In-depth accident DB (300 accidents per year)
- Medical and engineering network accident DB

  Detailed medical information is added to micro (20-30 accidents per year)

Macro accident DB

- It is based on the accident investigative information from the police
- Related data (driver's license, car registration, traffic census) are integrated
- It is managed by ITARDA

ITARDA : Institute for Traffic Accident Research and Data Analysis
Established by the Ministry of Land, Infrastructure and Transport + the Police Agency

Micro accident DB

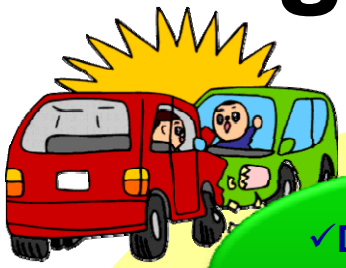
- Information about the vehicles' deformation, collision speed, and injury (AIS) are included
- Sketches and photographs of the scene of accidents, and photographs of accident vehicles are included
- It is managed by ITARDA

Medical and engineering network accident DB

- JARI and ITARDA jointly investigate accidents, obtaining cooperation of the rescue staff and the hospital

- One feature is that detailed medical data and ambulance use are included

Accident analysis by medical and engineering network



Medical and Engineering Network

Vehicles
- ✓Deformation
- ✓Collision speed
- ✓Safety device

Users
- ✓Position
- ✓Age, sex, physique
- ✓Injury
- ✓Medical data

Infrastructure
- ✓Road
- ✓Traffic

Investigation

- ・Crash test
- ・CAE

Analysis from both sides of medicine and engineering

↓

Injury mechanism

Measures

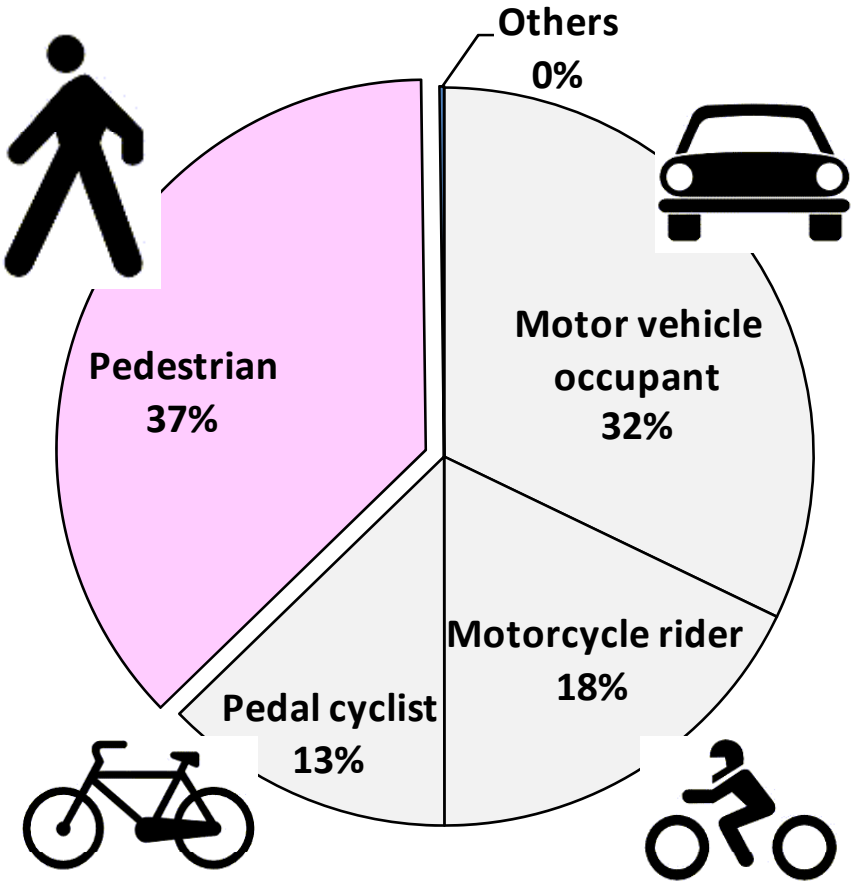
Analyzing factors of accidents, and measures

1. A typical accident is extracted using the macro accident DB
2. The detailed analysis of a typical accident is analyzed using the micro accident DB
3. Measures based on the factor of accidents are implemented

4. An example of accident data analysis and safety measures

Pedestrian safety

Fatalities in Japan (2012)



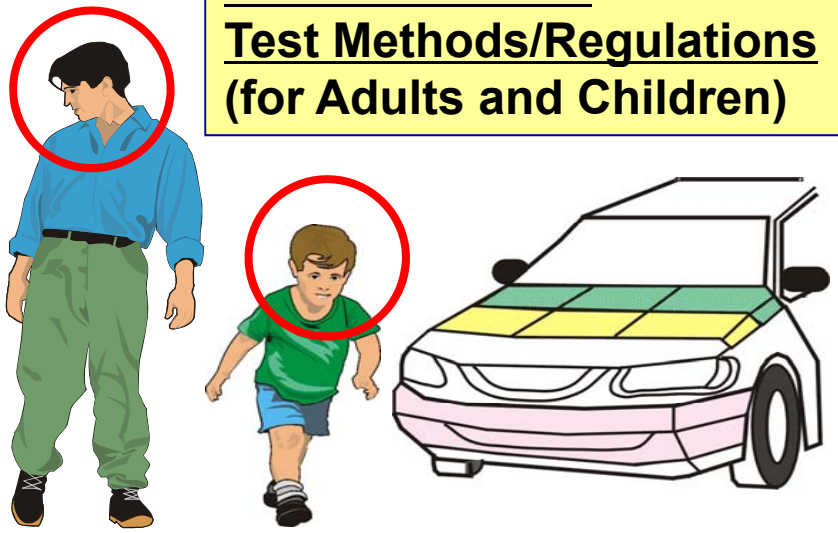
(Fatalities within 30 days)

Reference: Statistics of Traffic Accident, ITARDA, 2010, P169

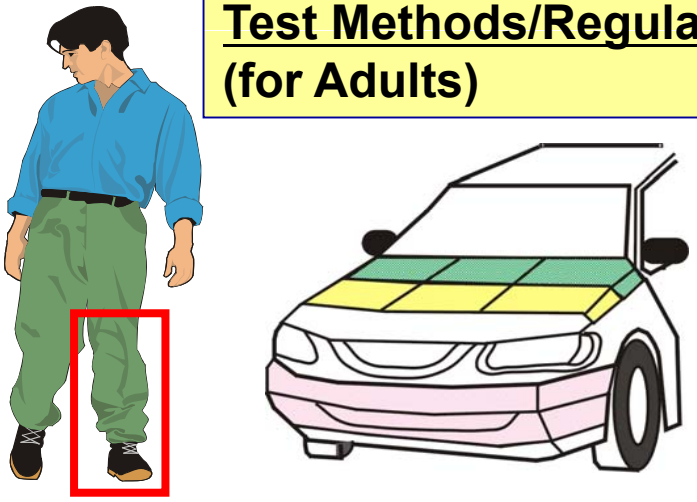
International pedestrian protection testing methods

Main Targets

Head Protection
Test Methods/Regulations
(for Adults and Children)



Leg and Knee Protection
Test Methods/Regulations
(for Adults)



Body part of a pedestrian's injury (Micro)

AIS 2-6

Injured Body Part	USA (1994-1999)	Germany (1985-1998)	Japan (1987-1998)	Australia (1999-2000)	All countries
Head	**32.7%**	**29.9%**	**28.9%**	**39.3%**	**31.4%**
Face	3.7%	5.2%	2.2%	3.7%	4.2%
Neck	0.0%	1.7%	4.7%	3.1%	1.4%
Chest	9.4%	11.7%	8.6%	10.4%	10.3%
Abdomen	7.7%	3.4%	4.7%	4.9%	5.4%
Pelvis	5.3%	7.9%	4.4%	4.9%	6.3%
Arms	7.9%	8.2%	9.2%	8.0%	8.2%
Lower Limbs	**33.3%**	**31.6%**	**37.2%**	**25.8%**	**32.6%**
Unknown	0.0%	0.4%	0.0%	0.0%	0.2%
TOTAL	100%	100%	100%	100%	100%

source: IHRA/PS WG 2001 report

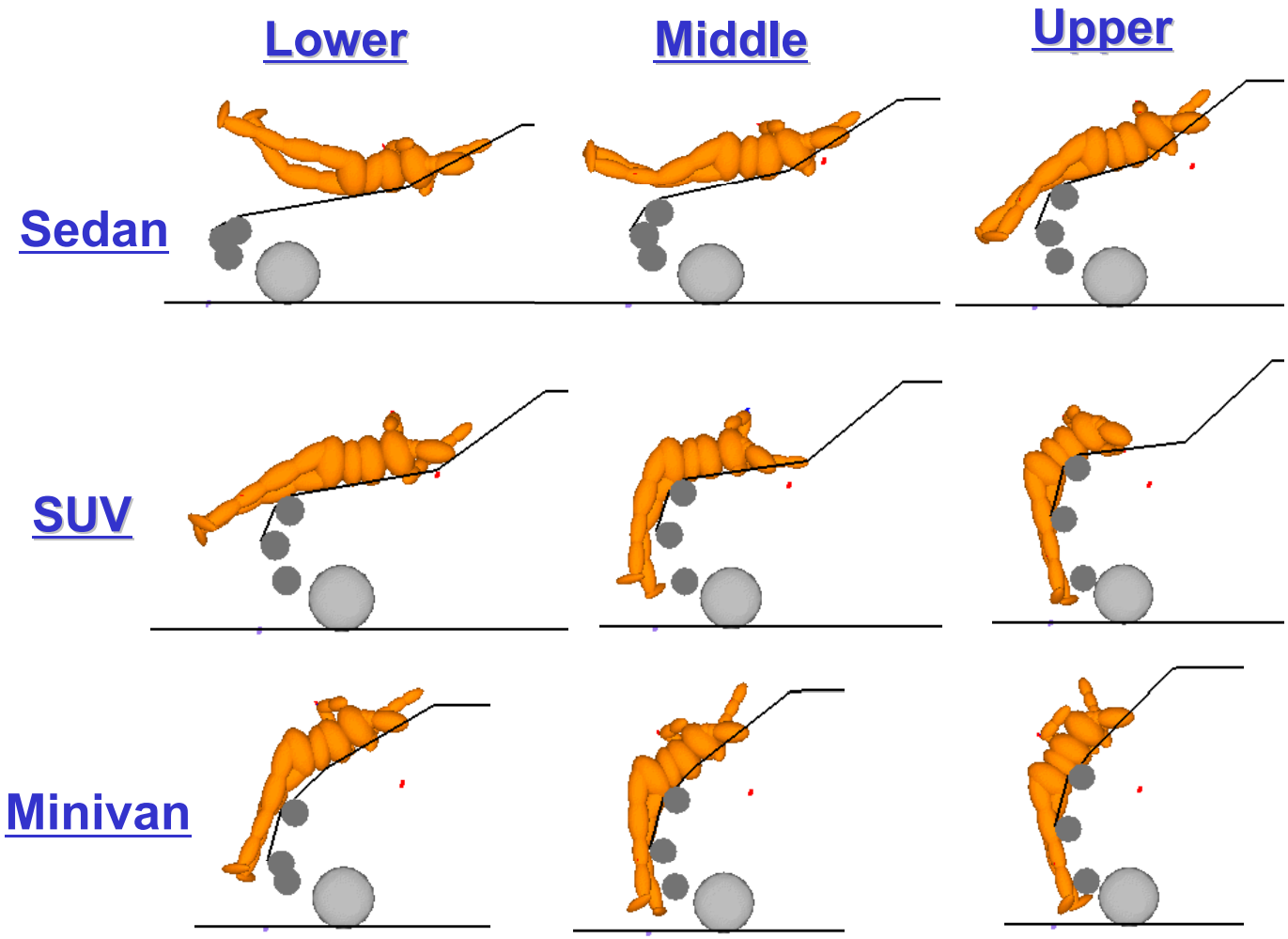
The injured part of the pedestrian lower limb (Micro)

AIS 2-6 USA, Japan, Europe, and Australia	Ages > 15 (Adult)				
Contact Location	Overall	Thigh	**Knee**	**Leg**	Foot
Front Bumper	1.6%	2.9%	**7.0%**	**43.5%**	2.9%
Top surface of bonnet/wing	2.1%	0.3%	0.1%	0.1%	0.2%
Leading edge of bonnet/ wing	4.7%	3.3%	0.5%	2.4%	0.1%
Windscreen glass	0.1%			0.1%	0.1%
Windscreen frame/ A pillars	0.5%	0.1%			
Front Panel	0.9%	0.9%	1.0%	3.2%	0.3%
Others	0.6%	0.4%	0.5%	2.6%	1.3%
Sub-Total	10.5%	8.0%	9.1%	52.0%	5.0%

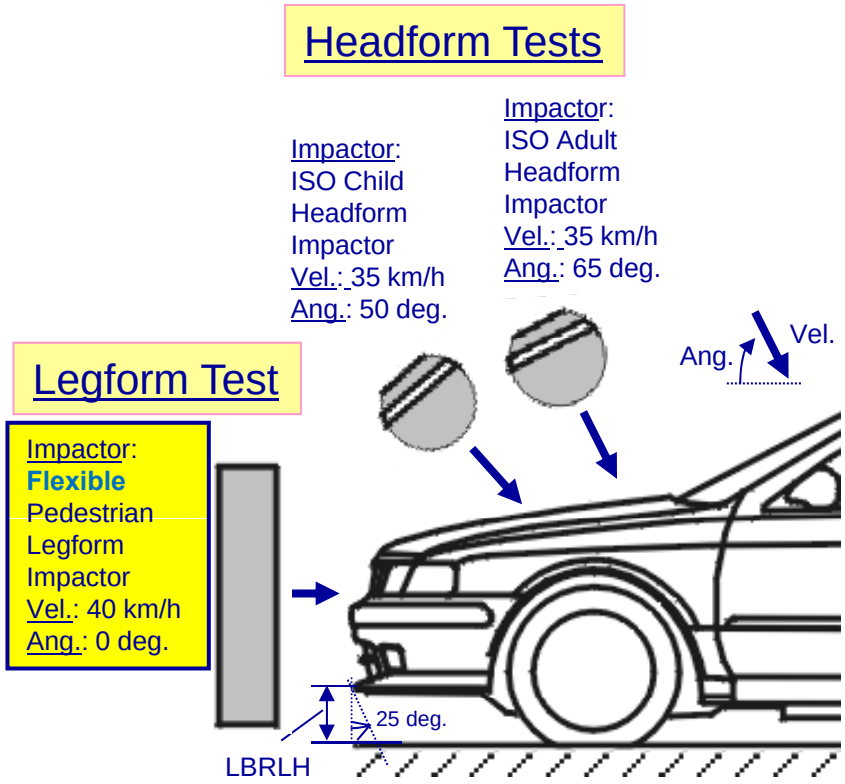
AIS 2-6 USA, Japan, Europe, and Australia	Ages < 16 (Child)				
Contact Location	Overall	Thigh	Knee	Leg	Foot
Front Bumper	0.3%	3.0%	0.7%	4.8%	0.2%
Top surface of bonnet/wing	0.2%				
Leading edge of bonnet/ wing	0.4%	0.7%	0.1%	0.6%	
Windscreen glass	0.1%				
Windscreen frame/ A pillars					
Front Panel		0.5%	0.1%	0.3%	
Others	0.9%	0.5%		1.3%	0.5%
Sub-Total	1.9%	4.8%	0.9%	7.0%	0.7%

source: IHRA/PS WG 2001 report

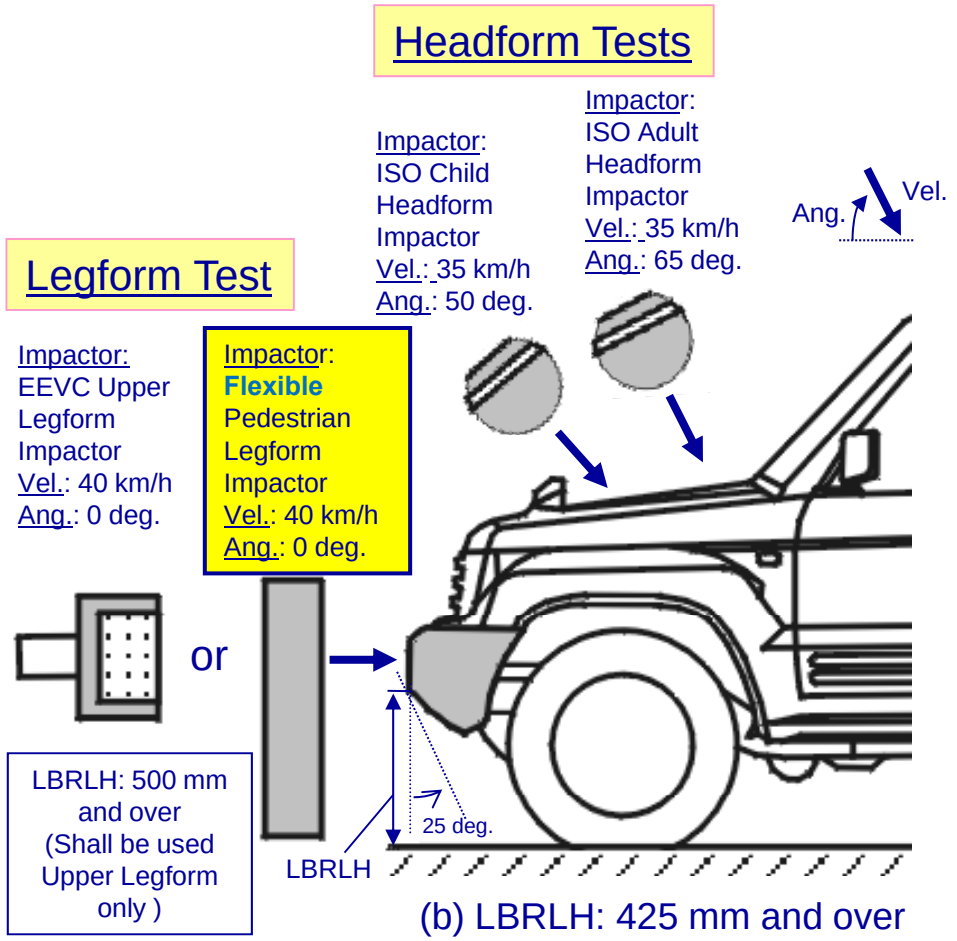
JARI: Accident reproduction using Computer Aided Engineering



United Nations GTR, Phase 2
(Global Techinical Regulation)



(a) LBRLH: less than 425 mm



(b) LBRLH: 425 mm and over

Lower Bumper Reference Line Height (LBRLH)

Safety education for children

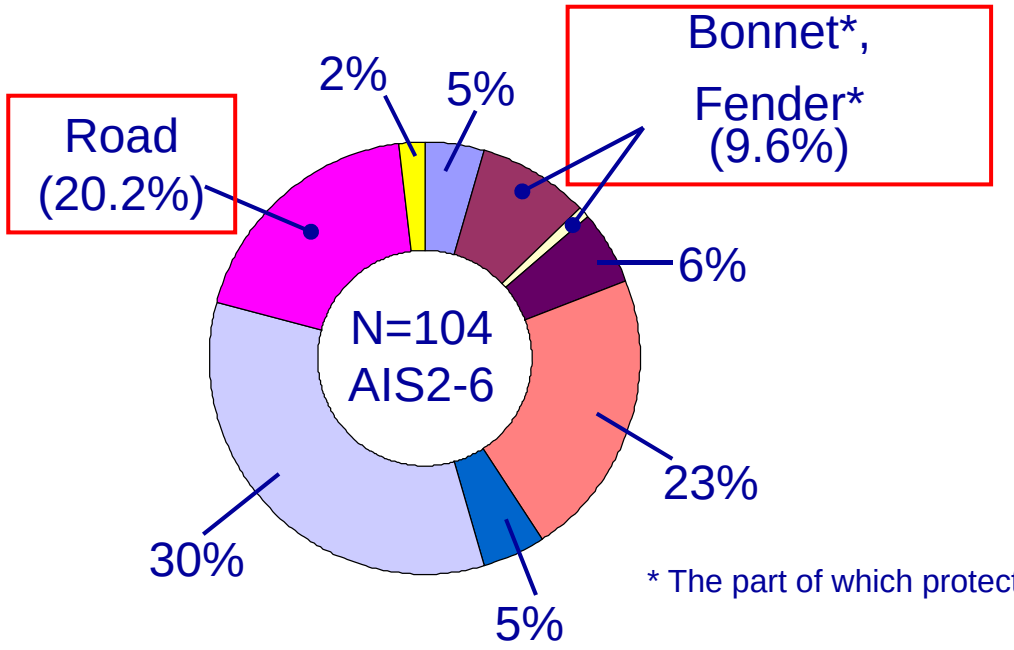
- Traffic safety education using a computer
  - The patterns of typical accidents are extracted from analysis of micro accident data and hearing data
  - 16 kinds of scenarios are set
    - In shadow of parked vehicles
    - Not checking signals
    - Not checking right-and-left
  - The effect was proved at an elementary school near JARI

Reference: JARI Research Journal, November, 2006, p 43

Self protection

- Head protection cap

Rate of parts causing head injury **AIS 2-6**



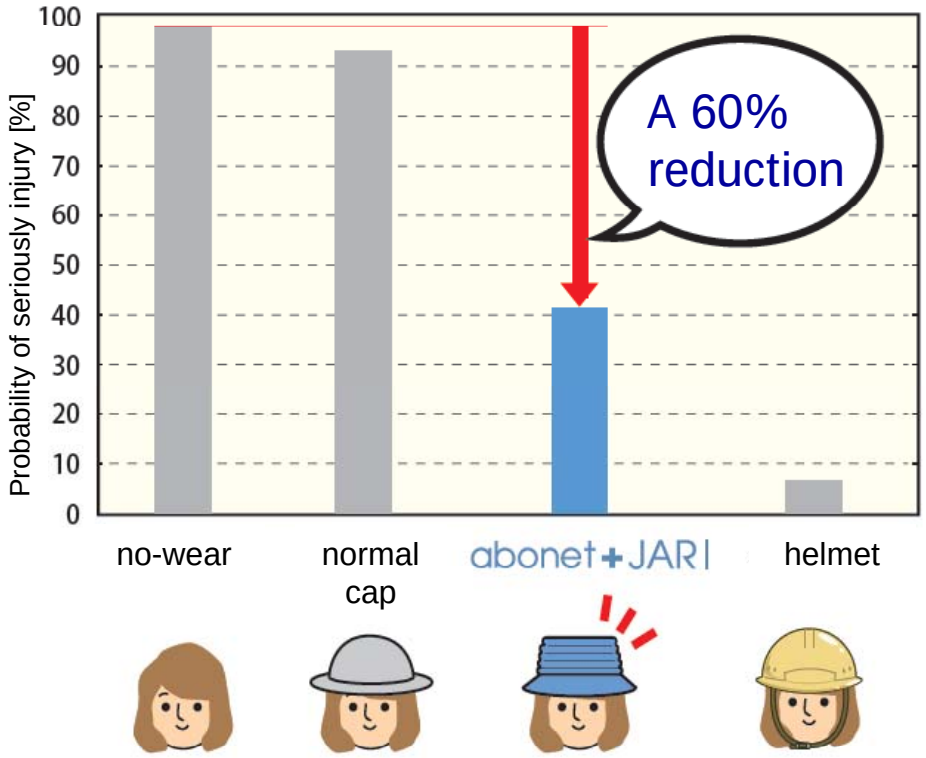
- Bumper
- Bonnet
- Fender
- Food edge
- Others
- Window frame / A pillar
- Front panel/Headlight
- Front window
- Road
- Unknown

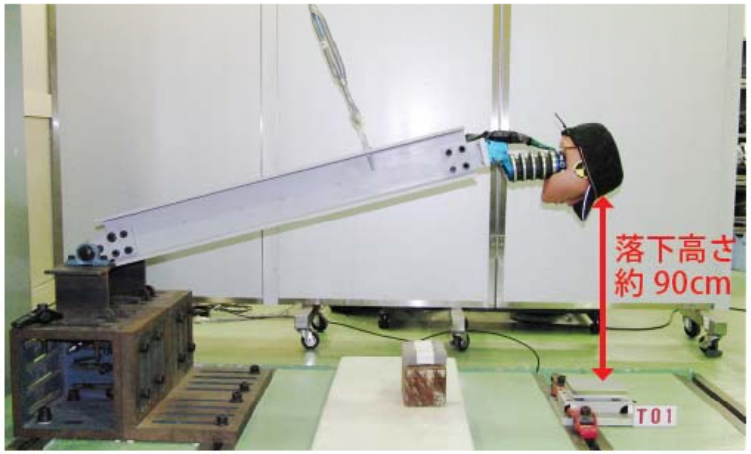
* The part of which protective performance is demanded by safety standards

Reference: ITARDA micro accident DB report (2002)

Performance of the protection cap

Evaluation test results





5. Conclusion

Conclusion

- In order to perform effective measures, it is important to understand the actual accident condition in each area
- Measures based on the features of each area are important
- Having an accident database in each area and using it widely is also important

How can JARI work with you?

- JARI can give technical support towards accident database construction in each area
  - Training seminar on traffic accident reconstruction