of

Associate Professor Okayama University

2-1 Trends and Present Situation Road Traffic Accidents

Seiii Hashimoto

After the latest peak in 1992, the number of traffic fatalities has shown a downward trend; in 2014, it dropped to 4113, continuing 6 years less than 5000. There has also been a continuous reduction in recent 14 years in the number of traffic accidents and the number of casualties; obviously, various efforts made in the past have started to pay off. A look at the details of traffic accidents by age: accidents involving young people (aged 20 to 29) have noticeably decreased, and are now less than those involving people 40 to 49 years old. But, the ratio of accidents involving the elderly (aged 65 and over) have been increased to more than half of whole accidents.

Fig. 1 Changes in the numbers of fatalities and injuries from traffic accidents, and changes in the number of accidents

Fig. 2 Changes in the numbers of fatalities and injuries from traffic accidents, by the number of inhabitants and vehicles $% \left(\frac{1}{2} \right) = 0$

■ The number of fatalities from traffic accidents decreased steadily, as did the number of accidents and the number of injuries



Source: White Paper on Traffic Safety in Japan 2015

Fig. 2 Changes in number of fatalities by age group

■All in all, a downward trend is evident. The number of fatalities is high for the elderly (65 and over). It has sharply decreased for those aged 20 to 29 (which is less than that for age 40 to 49)



Source: Traffic Statistics 2014 (Institute for Traffic Accident Research and Data Analysis)

■ The number of fatalities per 10,000vehicles are stable in low level.



Source: Traffic Statistics 2014 (Institute for Traffic Accident Research and Data Analysis)

Fig. 4 Changes in the number of traffic fatalities

■ Fatalities "in a vehicle" decreased noticeably; and since 2008, "in a vehicle" fatalities have been less than "while walking" fatalities.



Source: Traffic Statistics 2014 (Institute for Traffic Accident Research and Data Analysis)

Fig. 5 Traffic fatalities by situation and by age group

■ Elderly(aged 65 and over) traffic fatalities are the worst in the situation of "While walking", "On a bicycle", "On a moped", and "In a car"



Source: White Paper on Traffic Safety in Japan 2015

Fig. 6 Number of crackdown on traffic violation (announcement, referral)

■ Speeding is the most common traffic violation



Source: White Paper on Traffic Safety in Japan 2015

Table 1 Traffic fatalities worldwide, by situation (2013)

Situation	Number of	In a car	On a	On a	On a	While	Other
Country	fatalities		motorcycle	moped	bicycle	walking	
Germany	3,339	1,588	568	73	354	557	199
		47.6	17.0	2.2	10.6	16.7	6.0
France	3,268	1,612	631	159	147	465	254
		49.3	19.3	4.9	4.5	14.2	7.8
Netherlands	476	183	29	23	112	51	78
		38.4	6.1	4.8	23.5	10.7	16.4
U.K.	1,770	819	337	4	113	405	92
		46.3	19.0	0.2	6.4	22.9	5.2
U.S.A.	32,719	11,977	4,494	174	743	4,735	10,596
		36.6	13.7	0.5	2.3	14.5	32.4
South Korea	5,092	1,195	541	289	281	1,982	804
		23.5	10.6	5.7	5.5	38.9	15.8
Japan	5,152	1,081	502	357	813	1,864	535
		21.0	97	6.9	15.8	36.2	104

Upper figure: number of fatalities; Lower figure: percentage of total (%) For countries that used the coefficient to convert the number of fatalities into a 30-day figure, the total may not represent the sum of each figure. Source: Traffic Statistics 2009 (Institute for Traffic Accident Research and Data Analysis)

Source: Traffic Statistics 2014 (Institute for Traffic Accident Research and Data Analysis)

					<u>(person)</u>
Situation	While	Onia	On a	On a	In a car
Age	walking	bicycle	moped	motorcycle	
15 and under	2.4	1.1	0.0	0.1	1.2
16-24	2.8	2.0	3.4	8.8	13.6
25-29	3.9	1.3	1.2	4.9	9.6
30-39	3.2	1.0	0.8	4.0	6.7
40-49	4.1	1.5	1.3	6.0	8.1
50-59	6.7	3.1	1.9	4.4	10.5
60-64	10.6	5.5	1.2	2.0	11.7
65 and over	33.3	10.8	4.1	1.5	18.8

Fig. 7 Changes in traffic fatalities worldwide, by country (per 100,000 inhabitants)



Source: Traffic Statistics 2014 (Institute for Traffic Accident Research and Data Analysis)

Table 3 Number of traffic fatalities worldwide by age group (2013)

age	Number of	5 and	6-9	10-14	15-17	18-20	21-24	25-64	65 and	Unknowr
country	fatalities	under							over	
Germany	3,339	19	13	26	89	246	247	1,698	999	2
		0.6	0.4	0.8	2.7	7.4	7.4	50.9	29.9	0.1
France	3,268	44	24	29	102	253	383	1,745	688	0
		1.3	0.7	0.9	3.1	7.7	11.7	53.4	21.1	0.0
Netherlands	476	3	2	3	14	32	49	206	140	27
		0.6	0.4	0.6	2.9	6.7	10.3	43.3	29.4	5.7
U.K.	1,770	13	7	21	48	153	195	924	409.0	C
		0.7	0.4	1.2	2.7	8.6	11.0	52.2	23.1	0.0
U.S.A.	32,719	470	268	411	923	2,208	3,314	19,396	5,671	58
		1.4	0.8	1.3	2.8	6.7	10.1	59.3	17.3	0.2
South Korea	5,092	38	33	28	87	119	191	2,763	1,833	0
		0.7	0.6	0.5	1.7	2.3	3.8	54.3	36.0	0.0
Japan	5,152	40	41	21	95	171	180	1,833	2,771	0
		0.8	0.8	0.4	1.8	3.3	3.5	35.6	53.8	0.0

Upper figure: number of fatalities; Lower figure: percentage of total (%) For countries that used the coefficient to convert the number of fatalities

into a 30-day figure, the total may not represent the sum of each figure. Source: Traffic Statistics 2009 (Institute for Traffic Accident Research and Data Analysis)

Source: Traffic Statistics 2014 (Institute for Traffic Accident Research and Data Analysis)

Automobile Insurance System In Japan 2-2

General Insurance Rating Organization of Japan Automobile Insurance Department Manager, Research and Analysis Section Fuhito Tanabe

There are two main indemnifications in Japanese automobile insurance system, which are Compulsory Automobile Liability Insurance (CALI) and Voluntary Automobile Insurance. CALI provides basic indemnification for victims. When the amount of loss is more than the limits of CALI, Voluntary Automobile Insurance will be paid additionally. It is an excess cover to CALI.

In order to charge premiums fairly between policyholders, Voluntary Automobile Insurance has more classifications than CALI and premium sets adequately.

Figure 1 Compulsory Automobile Liability Insurance(CALI) and Voluntary Automobile Insurance

There are Compulsory Automobile Liability Insurance(CALI) which indemnifies for victims against an accident resulting in injury or death, and Voluntary Automobile Insurance which acts as excess cover to CALI in automobile insurance system. Various products are offered by putting together the coverage of Voluntary Automobile Insurance below.

Examples of payment situations		_		i Inden	nnity against any		
Indemnity against bodily injury or de policyholders, family members or persons inside the insured automo	ath for bile by	For people	For property ac		ccidental loss to the insured ehicle, such as collision, ontact and theft		
a car accident %Insurance is divided by accidents - subject of the payment and amount paid For oneself Prote		ersonal Injury Protection Coverage sengers' Personal Accident Coverage insurred Personal Accident Coverage ection Against Uninsured Automobiles	Damage to Own Vehicle Coverage (Voluntary I		Automobile Insurance (Voluntary Insurance)		
Acting as excess cover to CALI		Bodily Injury Liability Coverage	Property Damage Liability	Coverage			
Indemnity against legal liability for a car accident that you cause to others' death or injury		CALI (compulsory insurance)	Inde car dam	emnity aga accident t hage to ot	ainst legal liability for a that you caused hers vehicle or property		

A valid CALI certificate must be presented at each vehicle	3 the limits 3 the limits	of insurance	
inspection which ensures that every automobile is insured by	The limits of ins	urance currently in force are as follo	WS.
CALI (*1 compulsory insurance). Furthermore, it is stipulated	Types of damage	The items of loss	The limits of insurance per victims
<u>no-profit rule</u> and CALI indemnifies within ^{** 3} the limits of <u>insurance</u> . * 1 compulsory insurance No automobile (including motorized bicycle) shall be operated	For bodily injury	-Hospital fees -Documentation fees -Loss of earnings due to absence from work -Damages for pain and suffering etc.	¥ 1.2 million
unless a contract for CALI.	For permanent	-Loss of future earnings	¥750 thousand \sim 40 million
× 2 no-loss, no-profit rule	disability	-Damages for pain and suffering etc.	depending on the grade
Under the Act, it is stipulated that premium rates shall be as low as possible within the range of compensating reasonable costs of insurance business under the efficient management.	For death	-Funeral expenses -Loss of future earnings -Damages for pain and suffering	¥ 30 million

	Accidents subject	ct of the payment			
	Accidents while being inside the automobile	Other accidents	Amount paid		
Personal Injury	0*		Actual amount of damage		
Protection Coverage			(calculate according to the standards under policy conditions)		
Passengers' Personal	O ×		Will be paid the insured amount which is not depending of		
Accident Coverage			actual amount of damage		
Self-insured Personal	○(only self-insured	×	Will be paid the amount under policy conditions which is		
Accident Coverage	personal accident)		not depending on actual amount of damage		
Protection Against Uninsured Automobiles	* Will be paid only if -insured is killed or has sustained permanent disability -an automobile is not insured against bodily injury liability etc.		Will be paid the amount which is excess to CALI and Bodily Injury Liability Coverage within others' amount of legal liability for an accident.		

-Damages for pain and suffering

* Only "accidents while being inside the insured automobile" can be the subject of the payment depending on the contents of the contract.

Figure 2 Risk classification for CALI and Voluntary Insurance

There are two types of risk classification. One is depending on characteristics and another is depending on coverage.

	Classification								
	Area								
Charac-	(Ex. mainland, Okinawa, etc.)								
teristics	Vehicle Use & Type								
	(Ex.passenger car. freight car. private car. business car. etc.)								
	Term								
Coverse	(Ex. 5 days 1.27 months 48 or 60 months								
Coverae	depending on term of outemphilo inspection)								
	depending on term of automobile inspection)								
[Voluntary a	automobile insurance]								
	Classification (Example*)								
	Vehicle Use & Type								
	(Ex.passenger car, freight car, private car, business car, etc.)								
	Vehicle Model Code								
	(9 classification depending on model code)								
Charac-	New vehicle/ Old vehicle								
teristics	Main Driver's Age								
	(Can be classified only when 26 years old or over)								
	20 grades according to claim history the number of accidents								
	whether there was a contract previously								
	Grade from 7 to 20 are divided into two, claim free and claim								
	made								
	Insured Amount, Deductible								
	All ages / 21 years or over / 26 years or over								
Coverage	(3 classifications depending on indemnified drivers' age) *4								
Ű	Family / the insured, and husband or wife / All drivers								
	(3 classifications depending on the extent of indemnified drivers)								
* It show	s main classification of Reference Loss Cost Rates								
above, a	and insurance companies set their own classifications.								
₩4 Premi	um change depending on the age as it shows below								
Premium	for person of advanced age is quite high. The smaller								
coverage	is the lower premium is Also over 90% of drivers is 26								
verse or over									
high promiu									
nigh premiu									
low premium 🗆 🔲 🔲 💻 📖 🚃									
Main									
driver's ar	All $0^{\text{ver}} 2_{26-29}^{\text{ver}} 30^{\circ}\text{s} 40^{\circ}\text{s} 50^{\circ}\text{s} 60^{\circ}\text{s} 70^{\circ}$								
	, · · · · · · · · · · · · · · · · · · ·								
Indemnif	All 21 years or over 26 years or over								
unvers	ages								

Table1Examples of judicial precedent for large amount ofcompensation by car accident

Almost every policyholder set their insured amount of Liability Coverage to no limit because there are some judicial precedents more than 100 million yens.

The % of insured amount to no limit for Bodily Injury Liability Coverage is 99.4%, and for Property Damage Liability Coverage is 91.5%.

(Willion yer								
Accidents								
Injury o	r death	Property damage						
Amount of	Date of	Amount of	Date of					
damages	judgment	damages	judgment					
¥528.53	1/11/2011	¥261.35	19/07/1994					
¥397.25	27/12/2011	¥135.8	17/07/1996					
¥395.1	18/02/2011	¥120.37	18/07/1980					

Figure 3 The change of the number of death and injury by car accidents and the number of payment for CALI

Although the number of death and injury by car accident decreases gradually, the number of payment for bodily injury increases and for permanent disability stays almost the same.



 fiscal year represents the period starting on April 1 of the year and ending on March 31 of the following year
 Source:

-Disclosure document from General Insurance Rating Organization of Japan -National Police Agency "Traffic accidents situation(2014)"

Figure 4 The change of the premium income and claims paid for automobile insurance(voluntary insurance)



not including Personal Injury Protection Coverage

 $\boldsymbol{\cdot}$ including expense loading in premium income

Source:

Disclosure document from General Insurance Rating Organization of Japan

Figure 5 Change of the number of insured cars for Voluntary Automobile Insurance

While the number of cars owned increases, especially the number of light passenger cars insured increases.



It shows the number of Bodily Injury Liability Coverage

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Disclosure document from General Insurance Rating Organization of Japan

Professor, Akita University

2-3 Traffic Safety Program

Hidekatsu Hamaoka

Causes of traffic accident are widely distributed and these are influencing each other. Moreover, occurrence of traffic accident is rare; it is hard to identify the cause. To decrease the number of traffic accident, many countermeasures were conducted such as to install the all considerable measures into the blackspots and to inform the location of blackspots to the driver. As a result of these countermeasures, number of fatalities was decreased below 5000. Now, under the Basic Principles of 9th Fundamental Traffic Safety Program, road management authority is strengthening to apply various countermeasures that focuses on the pedestrian safety especially for the elderly person to realize the most safe road environment in the world.

Table 1 Basic Principles of 9th Fundamental Traffic Safety Program

Basic Principles of 9th Fundamental Traffic Safety Plan (FY2011-15) was designed on 31st March, 2011.

1. Achieving a Society with No Traffic Accidents

In order to build a truly prosperous and vibrant society, it is crucial to ensure the safety and security of the people.

2. Traffic Safety Concept of Prioritizing People By showing consideration to the elderly, the disabled, and children, the concept of "prioritizing people" in the traffic safety policy should be implemented in every possible measure.

3. Three Components Forming the Traffic Society

This program sets objectives to be attained for the following respective traffic sectors: "road traffic," "railway traffic," "traffic at railway crossings," "maritime traffic," and "air traffic" and clarifies the measures that should be taken for achieving these objectives with respect to the three components of traffic society formulating various measures, and vigorously promote these measures with the understanding and cooperation of citizens.

4. Utilization of IT

Since the use of IT counteracts inadvertent human errors, and can be furthermore expected to make a significant contribution to road safety, the usage of ITS and AIS is being actively promoted.

5. Enhancement of Rescue and Emergency Activities and Victim Assistance

It is essential to perform rescue and emergency medical care activities when traffic accidents occur, as well as aim for further improvement of support for victims in the area of traffic safety as well.

6. Promotion of Participation and Collaborative Traffic Safety Activities

In order to actively promote proactive road safety Activities of citizens, it is essential to create a system, in which people can participate from the planning stage according to the characteristics of the local regions

- 7. Effective and Efficient Implementation of Measures Due to the difficult financial situation, we should be conscious on focusing on measures that strive to achieve the maximum effect while maintaining budget execution efficiency, depending on the actual situation with local traffic.
- 8. Further Ensuring the Safety of Public Transportation We should strive to enhance and strengthen the security check, and transportation safety management evaluation.

Source: Cabinet Office

Table 2 Effort to install bicycle safety measures

Bicycle accidents become a social problem due to improper usage of bicycle. Major offences are as follows;

1. Red light running 2. Illegal usage of passage 3. Over speeding at the pedestrian road 4. Violation of passage 5. Roadblock to 6. Irruption to closed railroad crossing 7. Unsafe pedestrian movement at the intersection 8. Roadblock to prioritized vehicle 9. Unsafe movement at the roundabout 10. Violation of stop sign 11. Illegal usage of the pedestrian road 12. Using bicycle with defective brake 13. Drunk driving 14. Unsafe driving

Source: National Police Agency

Table 3 Traffic enforcement and speed regulation to contribute reducing traffic accident effectively

Recommendations to conduct traffic enforcement by utilizing the result of traffic accident and to reconsider the principle to set the maximum speed were reported.

Recommendation to conduct traffic enforcement and to set maximum speed

Common understanding to organize recommendation - Necessity to manage maximum speed

Maximum speed setting to avoid traffic accident

- Reconsideration of maximum speed at the road
- Share the concept to manage maximum speed
- Measures to lead to safe driving attitude
- Reconsideration of maximum speed at the expressway

Traffic enforcement to avoid traffic accident

- Traffic enforcement of speed violation to avoid traffic accident
- Inform the concept to manage traffic enforcement

Measures to promote steadily to avoid traffic accident

- Strengthening traffic enforcement of hazardous violation and crazy drivers
- Cooperation with city planning
- Promote traffic education except drivers
- Evaluation of company's effort to avoid traffic accident

Source: National Police Agency

unlicensed driver

Table 4 Strengthened penalties to the aggravated drivers Penalties were strengthened due to the traffic accident by the aggravated drivers such as drunk driving and

Legislation relates to the aggravated action causing the serious accident

- 1. Transfer from the Penal Code: Dangerous Driving Causing Death or Injury
- 2. Add a new category in the same weight of punishment as the Penal Code: Dangerous Driving Causing Death or Injury
- 3. Institute new Penal Code: Dangerous Driving Causing Death or Injury that have light punishment
- 4. Institute new punishment for escaping from the traffic accident site
- 5. Transfer from the Penal Code: Death or Serious Accident through Negligence
- 6. Institute heavy punishment to the unlicensed driver causing traffic accident

Source: Ministry of Justice

Figure 1 Countermeasure to increase pedestrian safety

Many traffic accidents occurred at unsignalized intersection in the road section. As the countermeasure for this traffic accident, two-step crossing method by utilizing the traffic island is demonstrated. Benefits, such as crossing pedestrian could confirm the approaching vehicle easily and crossing distance at one time would be shortened, are expected.



Source: Miyazaki Office of River and National Highway

Figure 2 Inform the existence of crossing pedestrian or bicyclist by the lighting raised marker

To decrease the pedestrian/bicycle accident at the intersection, system that inform the existence of pedestrian/bicycle to the right-turning vehicle is developed.





Source: Kochi National Highway Office

Figure 3 Installing roundabouts

Roundabout that has island in the center is a kind of intersection. It is easy for the driver to run through the roundabout because of the simple rule to pass. Effect of decreasing the traffic accidents is extremely high, therefore roundabout is commonly installed in the European countries. In Japan, roundabout is expected to be installed widely with the change of legislation about roundabout. Intersection at Nobe-town, Suzaka-city, Nagano



(Before roundabout)



(After roundabout)

Source: Suzaka City Office

Figure 4 Prevent backward movement at expressway

Reverse run in the expressway could bring to serious accident. Various countermeasures such as antirollback system, road marking to show the traveling direction, and so on, were installed at the exit of the service area and the parking area.



逆走防止装置 Warning sign to backward movement

路面に矢印を表示 Arrow marking

Source: East Nippon Expressway Company

2-4 Efforts toward Traffic Calming

Associate Professor, Okayama University

<u>Seiji Hashimoto</u>

In Japan, accidents on pupils' way to school motivate to improve the safety in residential area. The importance of the idea of traffic calming is now generally accepted. But, It is not easy to realize the idea. Despite efforts of local gov., traffic calmed areas are not so common.

These days, area-wide traffic calming measures such as ZONE 30 are installed in many cities and in some area, new approaches such as Shared Space are tried to install. Efforts toward traffic calming in Japan have been steadily promoting.

Fig. 1 Percentage of accidents of children (aged 15 and under) while walking by the distance from home (2013)

■Many accidents of children while walking happened near their house.



Source: Traffic Statistics 2013 (Institute for Traffic Accident Research and Data Analysis)

Fig. 2 First rising bollard in public street in Japan

First rising bollard on public street in Japan was installed in Niigata City, in October, 2014



Photo by Prof. Hisashi Kubota, Saitama Univ.

 \Box Speed Management is important in order to make the streets safe. On residential areas, area-wide 30km/h speed limit is the target in many countries, so, Japanese government also tried to install ZONE 30. 3,000 zones will be assigned for ZONE 30 areas until 2016.

Fig. 3 Outline of ZONE 30



Source: Website of Ministry of Land, Infrastructure, Transport and Tourism (http://www.mlit.go.jp/) Fig. 4 Probability of fatal injury for a pedestrian colliding with a vehicle



Sauce: Speed Management – A Road Safety Manual for Decision-makers and Practitioners

 \Box In order to make residential areas safer, Japanese Gov. make a study about the standard shape of traffic calming devices such as road humps and narrowing. In addition, some local gov. tried to make Shared Spaces that are safety measure without traffic signs, sidewalks, and so on.

Fig. 5 Road Hump, Road Narrowing (Bunkyo-ku, Tokyo) ■Road Humps reduce the vehicle speed well. Now the standard shape of road humps are considered by Japanese Gov. in order to overcome the weak point vibration and noise.



Fig. 7 Narrowing to reduce the rat running (Manchester, UK)

■ On two-way street, narrowings reduce the number of rut running vehicles.



Fig. 8 Road Space Reallocation

■ Road Space Reallocation toward cycle-friendly, walkable streets





Fig. 6 Narrowing (Katsushika-ku, Tokyo)

■ Narrowings reduce the vehicle speed. Now the standard shape of narrowings on two-way streets are considered by Japanese Gov. in order to reduce the number of rat running.



In order to reduce through traffic ,traffic restraint measures are installed at the entrance point in the direction of the through traffic.



Fig. 9 Japanese Style Shared Space in Izumo

■ On Shinmondori-street that is the approach of Izumo Shrine, Shared Space taking into consideration Japanese law was built in 2013.



Average vehicle speed : 37km/h \rightarrow 28km/h

2-5 Progress of Bicycle Transport

Nagahiro Yoshida

Recently, the modal share of commuter cycling has been increasing in urban areas though it has been decreasing on a national level. Under these situations, some national legal policies and technical guidelines related to bicycle infrastructure have been updated in order to realize that "bicycles are legal road vehicles, therefore cyclists must ride on roadways". In response to these changes, some cities try to encourage cyclists to use their bicycles as a primary mode of transport. Some cities have already adopted a bicycle plan that introduced bicycle lanes or shared lane markings on roadways. In terms of cycle tourism, Shimanami Kaido has become one of the most popular cycling routes in Japan. It contains many convenient facilities for tourists including a bicycle rental service, tourist stops, and navigation signs and markings.

Fig. 1 Recent changes of bicycle related policy and technical guideline

■In the last decade, national legal policies and technical guidelines related to bicycle infrastructure had been updated.

Year	Contents							
2007	Amendment of the Road Traffic Act; adding lines to clarify							
	the conditions of bicycle riding on pavements							
2008	MLIT and NPA; designation of 98 model districts realizing							
	bicycle ways							
2011	Amendment of the Traffic Signs Ordinance; introduction							
	of one-way regulation for bicycle track or path							
	NPA administrative circular "Promotion of general							
	measures for realizing favorable bicycle traffic system"							
2012	MLIT and NPA; issued of "Technical guideline for realizing							
	safer and more comfortable bicycle infrastructure"							
2013	Amendment of the Road Traffic Act; bicycle right-of-way							
	changed left-hand side of road only							
2015	Implementation of Amendment of the Road Traffic Act;							
	introducing safety education program for offenders							
	JSTE; publication of technical guideline "Design guidance							
	for junctions considering bicycle traffic"							

Fig. 2 The modal share of commuter cycling of major cities (2010)

The modal share of commuter cycling in the population census showed that prefectures including metropolitan areas or located in western part of Japan have higher rates.



Source: Population Census in 2010

Fig. 3 The modal share of commuter cycling by major city (2010)



Source: Population Census in 2010

Fig. 4 The modal share of commuter cycling by city (2010)

■Among 289 cities with population over 100 thousands, the modal share of commuter cycling between 2000 and 2010 has increased in 105 cities (36%), decreased in 178 cities (62%), and not changed in 6 cities (6%). In total, the share of cycling slightly fell from 12.2% in 2000 to 11.6% in 2010.



Source : Population Census in 2000 and 2010

Fig. 5 Trends of bicycle related accidents

■In the last decade, the number of bicycle related accidents has decreased since 2004, and in 2014, the most common accident is car-involved that shares 84%. Among total traffic accidents, the share of bicycle related accidents decreased by 19% in 2014. However, for the number of fatal accidents, bicycle alone accidents almost doubled compared with 2004.



Source: NPA "The state of bicycle involved accidents" (2015)

Fig. 6 Current situation of bicycle sharing system

■As of the end of Nov. 2014, bicycle sharing systems were implemented in 72 cities (59%) among 123 cities. The main purpose of the implementation was offering other transport option for tourists, complementing to public transport services, or vitalization of local area.



Source : MLIT "About Bicycle-sharing System" (2015)

Fig.7 The latest bikeways and parking facilities

Some local governments updated bicycle plans to introduce the latest bikeway facilities including bicycle lanes or shared lane markings on roadways as well as mechanical parking facilities utilizing land space.



(Osaka City) (Kagoshima City) Shared lane markings indicating direction and position



(Kyoto City) (Yokohama City) Parking facilities utilizing land spaces

Fig. 8 Progress in cycle tourism

■In European countries, cycle tourism grew in popularity and extensive cycle networks through countries were developed. In Japan, Shimanami Kaido (70 km) attracts cycling tourists all over the world. The informative infrastructure including navigation signs and markings along the routes is well developed. Other local areas also try to develop different types of cycling tours or events aiming at vitalization.



14 EUROVELO routes in EU and the route sign along route 6 in Nantes Source : http://www.eurovelo.com/





Blue-line in Shimanami Kaido

Cycling Event in Sorachi, Hokkaido

2 Efforts to Assure Safe and Comfortable Mobility 2-6 Movements of Parking Lot Policies: Problems and countermeasures of urban parking lots
Associate Professor, Nihon University <u>Masaharu Oosawa</u>
In Japan, 20% of inner-city areas are occupied by parking lots, and 20% of urban areas are occupied by roads. In other words, about 40% of the country's urban

areas are used for cars. Since the establishment of the Parking Lot Act in 1957, parking lots have been aggressively developed in Japan, with the aim of smoothing road traffic, and recently, parking lots supply has exceeded demand in some areas. On the other hand, as a result of changes in the country's socioeconomic conditions, vacant lots have become increasingly used as tentative parking lots and are now scattered throughout urban areas, creating traffic issues at the local level. Introduction of restrictions on parking lot locations is currently under consideration. The era of trying to secure sufficient parking lots is now behind us. Parking lots have been consolidated under the 2012 Low Carbon City Act, and the optimization of parking lot locations was institutionalized by the 2014 amendment to the Special Measures Concerning Urban Renewal Act. These developments marked the start of new developments related to parking lots.

Figure 1. Changes in the momentary number of four-wheeled vehicles parked illegally on streets of Tokyo

Illegal parking had been on the decline but increased in the 23 wards in 2010 and the Tama District in 2011. Illegal parking has remained at the same levels.



Source: Created by the author using data from the Metropolitan Police Department (www.keishicho.metro.tokyo.jp/kotu/chusya/chusya.htm).

Figure 2. Changes in the momentary number of motorcycles parked illegally on streets in the 23 wards of Tokyo

■ Illegal parking has been on the decline since 2006.

Source: Created by the author using data from the Metropolitan Police Department (www.keishicho.metro.tokyo.jp/kotu/chusya/chusya.htm).



Table 1. Classification of parking lots nationwide under the Parking Lot Act

• Most of the parking lots are mandatory attached parking facilities.

Division	Spaces	Rate
City planning parking lots	118,477	2.5%
Registered parking lots	1,661,432	34.8%
Mandatory attached parking facilities	2,997,363	62.7%
On-street parking lots	775	0.02%
Total	4,778,047	100.0%
Number of car ownership	76,696,825	
Number of parking spaces per ten thousand car	623	

Source: Created by the author using fiscal 2013 data from the 2014 Annual Report on Automobile Parking Lots (City Bureau, Ministry of Land, Infrastructure and Transport, 2014).

Figure 3. Increase in the number of parking lots in urban areas
Parking lots converted from vacant lots have continued to increase.
In this area, the number increased by 1.9-fold between 1993 and 2012.



Source: 2013 White Paper on Land (Ministry of Land, Infrastructure and Transport, 2013)

Table 2. Availability of motorcycle parking lots

■ When motorcycle-only and motorcycle and car parking lots are combined, 1,200 parking lots (49,061 spaces) have been developed.

	City planning parking lots		Registered parking lots		Mandatory attached parking facilities		On-street parking lots		Total	
	Parking lots	Capacity	Parking lots	Capacity	Parking lots	Capacity	Parking lots	Capacity	Parking lots	Capacity
motorcycle s and cars	55	10,387	109	23,243	5	37	1	26	170	33,693
motorcycle -only	73	4,469	181	5,965	750	3,933	26	1,001	1,030	15,368
Total	128	14,856	290	29,208	755	3,970	27	1,027	1,200	49,061

Source: Created by the author using fiscal 2014 data from the 2014 Annual Report on Car Parking Lots (City Bureau, Ministry of Land, Infrastructure and Transport, 2014)

Table 3. Number of motorcycles accepted at bicycle parking lots

• To respond to an increase in motorcycles and their illegal parking, some parts of bicycle parking lots have been converted to spaces for motorcycles.

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Cities		Parking lots	Capacity	Total
264	bicycles and motorcycles	864	164,758	165,622
	bicycle-only	697	91,181	91,878

Source: Created by the author using fiscal 2014 data from the 2014 Annual Report on Parking Lots (City Bureau, Ministry of Land, Infrastructure and Transport, 2014).

Figure 4. Number of parking spaces available (supply) and parking spaces used at peak times (demand) on weekdays in the 23 wards of Tokyo in fall 2014

Parking demand is being met by supply. On weekends and public holidays, demand is also being met by supply, but demand is higher than on weekdays.



Source: Created by author using the data of the 2014 survey on on-street parking (Metropolitan Public Corporation for Road Improvement 2015)

Fig. 5 Changes in the number of car ownership and the number of parking spaces available

• The number of car ownership has been on the decline after peaking in 2006, whereas the number of parking spaces available has continued to increase.



Note: The total number of parking spaces available = Total of parking spaces available at city planning parking lots, registered parking lots, and on-street parking lots.

Source: Created by the author using fiscal 2013 data from the 2014 Annual Report on Parking Lots (City Bureau, Ministry of Land, Infrastructure and Transport, 2014).

Figure 6. Changes in the number of mechanical parking facilities

■ To secure sufficient parking spaces in limited land area, mechanical parking facilities have been developed. Overseas development has recently begun; in 2014, it was announced that technologies related to mechanical parking facilities would be transferred to Singapore.



Source: Created by the author using fiscal 2014 data from the 2014 Annual Report on Parking Lots (City Bureau, Ministry of Land, Infrastructure and Transport, 2014).

Figure 7. Accidents at mechanical parking facilities

■ Although the number of accidents at mechanical parking I facilities is on the decline, accidents resulting in death or injury at mechanical parking facilities have occurred frequently. In 2014, a guideline was created for the establishers and managers of mechanical parking facilities to promote awareness about accidents.



Source: Created by the author based on "Recent Development of Parking Measures" (Urban Transport Facilities Division, City Bureau, Ministry of Land, Infrastructure, Transport and Tourism, 2015).

2 Efforts to Assure Safe and Comfortable Mobility Research Associate. Institute of Industrial Professor, Institute of Industrial 2-7Trends and Activities in ITS Science, the University of Tokyo Science, the University of Tokyo Takashi Oguchi Kentaro Wada In 2014, the medium- and long-term goals and directions of ITS developments, which private companies and relevant ministries and agencies should address together, was decided by the IT Strategic Headquarters. Their main targets are (1) safety driving support systems and automated driving systems and (2) the utilization of road transport data; these are expected to be implemented and promoted by strategically exploit opportunities offered by the 2020 Tokyo Olympic and Paralympic Games. The automated driving was also selected as one of the topics in the

Strategic Innovation Promotion (SIP) Program since 2014, and its R&D has been activated.

□ In "Declaration to be the World's Most Advanced IT Nation" approved by the Cabinet on the basis of the study of IT Strategy Headquarters in June 2013, ITS is regarded as a key tool to build "a society with world's safest, environmentally-friendly, and economical road transportation". Then, "Public-Private ITS Initiative/Roadmaps - Strategies on Automated Driving Systems and the Utilization of Road Transport Data to Build a Society with the World's Safest and Smoothest Road Traffic -" was decided in June 2014 (revised to June 2015).

Fig.1 Setting goals and indicators (ITS Initiative/Roadmaps)



Fig.2 Relationship between automobiles and the structure for the utilization of road transport data



Source: Public-Private ITS Initiative/Roadmaps 2015

Fig.4 Driving Safety Support Systems (DSSS)

Source: Public-Private ITS Initiative/Roadmaps 2015

□ Methods of driving support are classified by the degree of involvement in the operation of the vehicle. In terms of information collection, the methods are grouped into autonomous type and cooperative Type. The former mainly has been developed by private companies and the road infrastructures have been developed for the latter. Experiments of self-driving cars on public roads have been conducted all over the world, and we are entering competitve age for practical application and popularization of automated driving systems on a global scale.

Fig.3 Definitions of safety driving support and automated driving systems

SIP-adus (Automated Driving for Universal Services) presents a target of developing the market of Level 3 by around the first half of the 2020s, and develop that of Level 4 in the late 2020s (trial period).

Categories		Outline	System	ns
Informational		Alerting drivers	Driving Safety Support	
	Stand-alone (Level 1)	Any of the acceleration, steering, or control operations is done by the system.	Systems	
Automated	Compounding of systems (Level 2)	More than one of the acceleration, steering, and control operations is done by the system at the same time.	Semi- Automated Driving Systems	r.
	Advancement of systems (Level 3)	All of the acceleration, steering, and control operations are done by the system. Drivers only act on the request of the system.		Automated Drivinç Systems
	Fully automated driving (Level 4)	All of the acceleration, steering, and control operations are done by everything other than drivers. Drivers have no involvement at all.	Fully Automated Driving Systems	

Source: Public-Private ITS Initiative/Roadmaps 2015



Source: National Police Agency website

Fig.5 Traffic smoothing at sag section by I2V cooperation

Services utilizing Adaptive Cruise Control (ACC) and I2V (Infrastructure-to-Vehicle)communication are studied.



Fig.6 Advanced Rapid Transit (ART): A next-generation urban transportation system by automated vehicle technologies (1) World Standard Accessibility



Source: NILIM website

Source: SIP website

□ The government began to promote the utilization of probe data, which is now mainly collected and utilized by private companies, because the data contributes to an information provision in a disaster and to congestion measures. The public and private sectors are also studying on data standards and ways to open data in order to share or link traffic-related information (horizontal division of labor), while the data currently is prepared and built separately.

Fig.7 Advanced traffic control system utilizing probe data



Source: National Police Agency website

Fig.9 Various driving support services utilizing ETC2.0



Source: MLIT webpage

Fig.8 A study on the structure of probe database

Integration methods of a wide variety of probe data are being studied for improving the amount and precision of information.



Source: METI webpage

Fig.10 Regional ITS information center initiative

The center integrates traffic information owned by both public and private sectors and utilizes it for immediate response to accidents and disasters and regional government services.



Source: Reproduced by the authors based on ITS Japan website

2-8 Mobility Management Measures

Graduate School of Engineering, Kyoto University

Yusuke Kanda

Associate Professor,

In recent years, MM is being implemented. along with various TDM measures worldwide. MM emphasizes creating a responsible awareness among each person. Late 2000s, MM has begun to be applied in practice to relax traffic congestion, promote public transportation use. Recently, MM has widely applied on transportation, town management. And MM tries innovates a concept of design, information technology. Essentiality of MM is "Tenacious communication and cooperation among stakeholders to overcome the problems associated with transportation and town management".

Fig. 1 Share of types of MM in Japan – Project reported in JCOMM (Japanese Conference on Mobility Management-

In the spread phase of MM (MM was begun to be positioned as a transportation policy of national/local government), MM was mainly applied on promotion of transportation use. Recently, MM is increased to be applied on "Town Management", "in School", "Shopping Behavior".



Table 1 Theme of Special Session in JCOMM

■ New possibility of MM is discussed in JCOMM every year. Recently, innovation of MM with "Information Technology", "Design", "Public Health" is focused

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year	Theme of Special Session in JCOMM		
2011	Mobility considering mega-earthquake		
	MM for commuting / MM for city center vitalization		
	MM for aging society in rural area		
2012	Mega-earthquake and MM		
	MM in local cities/towns		
	MM in school education / MM collaborating with Mass Media		
2013	Mega-earthquake and MM		
	MM for Sightseeing, leisure, shopping activity		
	Strategic deployment of MM		
	MM with various participants /MM and information		
	technology		
2014	MM and public health		
	MM and government's policy / Strategic deployment of MM		
	Emotional MM projects		
	Possibility of MM for safer society		

2015 MM and Design / MM by transportation firm MM and information technology

Table 2 Topics in ECOMM

In Europe, ECOMM (European Conference on Mobility Management) is held every year. Recently in ECOMM, installation strategy of new mobility such as EV, information technology have been discussed.

year	Theme and topic		
2010	moving people – bridging spaces		
	MM in historical centers / MM for new districts		
	Cross linking of districts and regions		
	MM for all generations / New forms of mobility		
2011	Economic Recession: A New Dawn for Mobility Management		
	Financing and sponsoring / Marketing and partnerships		
	Resource-constrained world / Shared space, responsibilities		
	Travel networks and Life Cycle analysis		
2012	Mobility Management- Key Factor for European		
	Development		
2012	e-Mobility / Regeneration of cities / Immigrants and MM		
	Climate change / Demographic Focus in MM		
2013	Smart Choices require easy access		
	IT, Gamification, Fun		
	MM and the economy / Sustainable MM plans		
	Creating the bridge to a green, fair and prosperous mobility		
2014	future		
	Walking - beyond the city centers / Citizens participation		
	How to ensure free access to multimodal travel information		
	e-mobility / City logistics		

Fig. 2 MM and Design – Toward Attractive Transportation

"Design" have been focused to increase attractiveness of public transportation. For example, "Hitachi BRT", in Ibaraki, has introduce total design concept, well-designed bus body (left photo), bus stop (right), route map and timetable (below). Residents of wayside highly evaluated for the design, and number of passengers of Hitachi BRT has been increasing.



Source: Hitachi City



□ While advancement of information technology, development, installation and operation of information tools introducing the concept of Mobility Management have been progressed. For example, Misawa City, Aomori, introduces simplified bus-location system display (Fig. 3) and monitor (Fig. 4) that consider users' usability, easiness-to-understand. It contributes to increase convenience of public transportation and led to increase number of passengers.

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大津前平編

川目・鹿中方面

経由

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19







Yellow and Black icon indicates "bus has already left". Source: Misawa City, ITS ALLIANCE Co., Ltd.

Fig. 5 MM Application on Traffic Safety

■ Incorporating process of attitude and behavior change by Mobility Management, with "perception", "awareness", and "considering", traffic safety measures that promote drivers' safety driving behavior. Hanshin Expressway Co., Ltd. that operates inner-city expressway road service has developed interned-based driving education and training program for free. The program makes a diagnosis on each driver's driving characteristics based on huge objective data, such as traffic accident records, and give concrete advice to drivers based on each driver's characteristics. Many companies and industry groups introduce this program into traffic-safety training course.



Give questions under real situation



Source: Hanshin Expressway Co., Ltd.

Evaluation, feedback and reconfirmation



Fig 4. Simplified Bus Location System



Bus position information by simplified display.

Source: Misawa City, ITS ALLIANCE Co., Ltd.

Fig. 6 MM with local residents' active participation

■ In order to improve local transportation service and pursue better town management, local residents' active participation is essential. Kyoto Municipal Transportation Bureau has introduced collaboration program with local residents, that discuss local transportation service such as service route, frequency, and promotion measures to increase number of passengers, with support of city government and advisors since 2014. Currently, four community groups join this program.



Source: Kyoto Municipal Transportation Bureau