

THE SIGNIFICANCE OF “PERMANENT DISABILITIES DATABASE” BASED ON AUTOMOBILE COLLISIONS IN JAPAN

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ABSTRACT

In Japan, the number of automobile liability insurance payments in 2002 made to victims with permanent disabilities amounted to 58,380 or 1.56 times higher than a decade ago. Of these, 2,420 or 1.61 times higher than the previous decade were payments for those with severe permanent disabilities. With these statistical data, it is indispensable to consider the occurrence of permanent disabilities, the implementation of automobile safety measures and steps to be taken in the coming years.

The authors analyzed and reviewed the situations of traffic accident injuries resulting to permanent disabilities by examining 429,863 injured cases (persons) and the corresponding automobile liability insurance payments made since 1994 and thereafter. These cases were based from the Ministry of National Land, Infrastructure and Transport’s computer data recorded since 1994, and from the compiled database on the national traffic accident of the Institute for Traffic Accident Research and Data Analysis (ITARDA). This indicates that it takes at least 5 to 6 years for the fixation of permanent disabilities symptoms after the occurrence of each automobile accident. The number of victims with severe permanent disabilities (first to third grades) increased by 23 % (annual increase of 45 persons or so) in the 7-year period between 1992 to 1999, while the number of victims with minor permanent disabilities (12th to 14th grades) increased by 76 % in the same period (annual increase of 1,600 persons or so).

It is found that determining the effects of vehicle safety structures (crashworthiness), and occupant protection systems, are indispensable to the reduction of incidence of permanent disabilities, and to the development of such structures and systems.

INTRODUCTION

The number of accidents, injury accidents, and fatal accidents on Traffic in Japan all peaked in 1972, after which they all declined (Figure 1).

However, in 1977 the number of accidents in all three accident categories began to increase, especially non-fatal injury accidents. In contrast, the number of fatal accidents has tended to decrease since 1992. The decline in the number of fatalities appears to be largely the result of improvements in automobile safety devices such as seat belts and air bags, better emergency service, and other advancements.

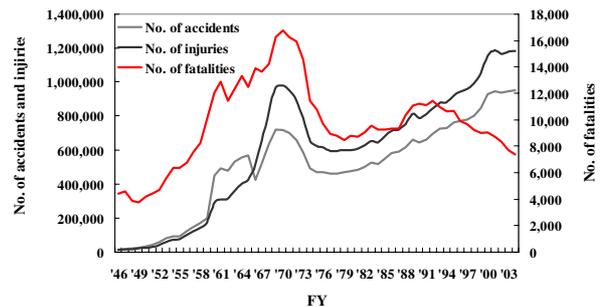


Figure 1 Conditions related to the occurrence of traffic accidents

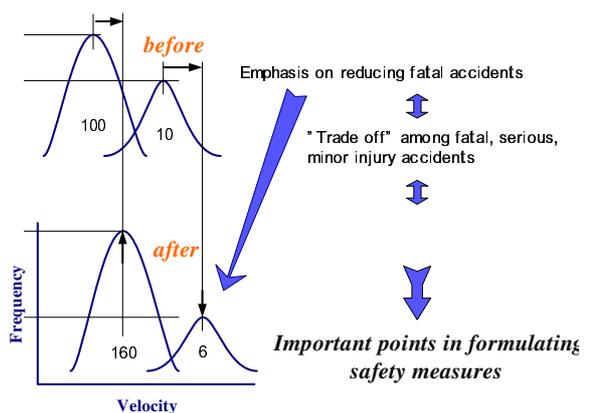


Figure 2 Conceptual diagram of automobile safety countermeasures and associated trade-off

At the same time, improvements in automobile safety countermeasures, emergency services, etc., have meant that what had previously would have been fatal injuries were now serious injuries, and what previously would have been

serious injuries were becoming minor injuries (Figure 2). As a result, it appeared that there would be increases in both serious and minor injuries.

Furthermore, if the occupant protection devices, car crashworthiness, etc., are not adequate to reduce the energy force on the human body, the increase in serious injuries could be assumed to be reflected in the increase in accident victims suffering lasting effects from their injuries.

Efforts are now being made to further improve automobile safety technology. To better guarantee the effectiveness of these improvements, we must have a thorough understanding of trends in the occurrence of injuries to the human body and work to introduce more effective automobile safety technology.

In the present study, an effort was made to match permanent disability data based on liability insurance claims from the Road Transport Bureau, the Ministry of Land, Infrastructure and Transport (MLIT), with integrated traffic accident data of the Institute for Traffic Accident Research and Data Analysis (ITARDA). Trial and error analyses were also made on the state of permanent disabilities caused by automobile collisions, and the necessity and practicality of constructing a "permanent disability database" were investigated.

DATA SOURCE

Occurrence of permanent disabilities resulting from traffic accidents

The number of people becoming seriously injured in traffic accidents has stabilized (Figure 3). However, in contrast to the decline in fatalities, the number of people receiving lasting injuries has tended to increase.

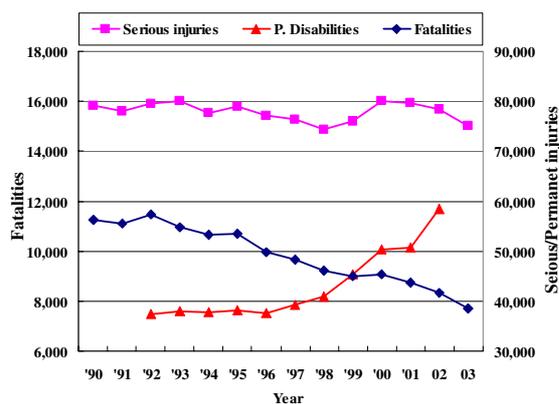


Figure 3 Annual trends in number of people with permanent disabilities vis-a-vis number of fatalities and serious injuries

Incidentally, 58,380 of the claims paid by liability insurance companies were for permanent disabilities in FY 2002, including payments made on 2,420 claims of serious permanent disabilities.

Compared with the data from 1992, that is, 11 years ago, these figures represent increases of 54% and 61%, respectively. Given this background, it will be necessary in future traffic safety measures to incorporate the perspective of reducing injuries, including permanent disabilities.

Trends in occurrence of accidents and symptoms of permanent disabilities by year

Insurance payment for permanent disabilities is not necessarily made in the year the accident occurs, and is often made one or a few years after the accident. In many cases, therefore, payment to an injured person is made more than once, and sometimes over a few years. This study is intended to analyze the occurrence of permanent disabilities in traffic accidents for individual victims. So we must make an effort to match the "integrated traffic accident data" which is constructed in the year of an accident with "permanent disability data based on liability insurance claims" constructed after permanent disabilities are certified by the appearance of symptoms sometime after an accident.

Table 1 shows the relationship between the year an accident occurred and the year when symptoms of permanent disability became apparent. As for the accidents which occurred in 2001 and 2002 it can be estimated that a large amount of data has not been added to the database since permanent disabilities have not yet been confirmed. Incidentally, for accidents which occurred in 1992 or 1993, it took 5 or 6 years for about 98% of the permanent disabilities to be confirmed.

Table 1 Year-by-year trends in the fixation of permanent disability symptoms caused by different accidents

(Unit : Number of people involved in traffic accidents (upper column) and % (lower column))

Year of occurrence of an accident	Year of fixation of permanent disability symptoms													Total
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003		
1992	3,229 13.5%	11,982 50.2%	5,725 24.0%	1,708 7.2%	617 2.6%	304 1.3%	137 0.6%	78 0.3%	40 0.2%	28 0.1%	15 0.1%	2 0.0%	23,865 100.0%	
1993		5,960 21.5%	13,372 48.2%	5,615 20.2%	1,686 6.1%	579 2.1%	282 1.0%	114 0.4%	69 0.2%	39 0.1%	13 0.0%	5 0.0%	27,731 100.0%	
1994			5,973 22.1%	13,044 48.3%	5,303 19.6%	1,649 6.1%	579 2.1%	250 0.9%	125 0.5%	67 0.2%	21 0.1%	5 0.0%	27,016 100.0%	
1995				6,318 22.9%	13,715 47.7%	5,872 20.4%	1,815 6.3%	627 2.2%	256 0.9%	87 0.3%	47 0.2%	10 0.0%	28,744 100.0%	
1996					6,227 21.8%	14,109 49.5%	5,667 19.9%	1,685 5.9%	555 1.9%	210 0.7%	60 0.2%	10 0.0%	28,523 100.0%	
1997						6,683 21.8%	15,486 50.6%	6,113 20.9%	1,648 5.4%	526 1.7%	152 0.5%	20 0.1%	30,628 100.0%	
1998							7,451 22.5%	17,775 53.7%	6,028 18.2%	1,451 4.4%	349 1.1%	45 0.1%	33,099 100.0%	
1999								8,723 23.7%	20,325 55.3%	6,307 17.1%	1,333 3.6%	119 0.3%	36,807 100.0%	
2000									9,299 25.5%	20,967 57.6%	5,696 15.6%	453 1.2%	36,415 100.0%	
2001										9,420 29.0%	20,646 63.7%	2,369 7.3%	32,435 100.0%	
2002											7,271 46.5%	8,369 53.5%	15,640 100.0%	
Total	3,229 1.0%	17,942 5.6%	25,076 7.8%	26,685 8.3%	27,548 8.6%	29,196 9.1%	31,417 9.8%	35,365 11.0%	38,345 11.9%	39,102 12.2%	35,603 11.1%	11,401 3.6%	320,903 100.0%	

Note 1) The year of symptom fixation is adjusted by the difference between the age at which the accident occurred and the age at which the claim was made for permanent disability.
2) The period of 5 years after the occurrence of an accident goes to 1999, and is shown by hatching.

According to this result, it can be pointed out that it takes about 5-6 years for the symptoms to become fixed. In order to make a more precise analysis of these injuries, we need at least 5 or 6 years after their occurrence for the study. This means that it is important to make a prompt and accurate diagnosis at the time of the accident, as well as to accurately predict the occurrence of permanent

disabilities. In other words, it is necessary to develop a scale for permanent disabilities at the time of injury diagnosis.

RESULTS AND DISCUSSION

Trends in the number of people sustaining permanent disabilities

Figure 4 shows annual trends in the number of occurrences of permanent injuries from 1992 to 2002. As we can see, there is an increasing trend. It should be noted that there is still a large amount of data missing for 2001 and 2002, making it difficult to confirm permanent disabilities.

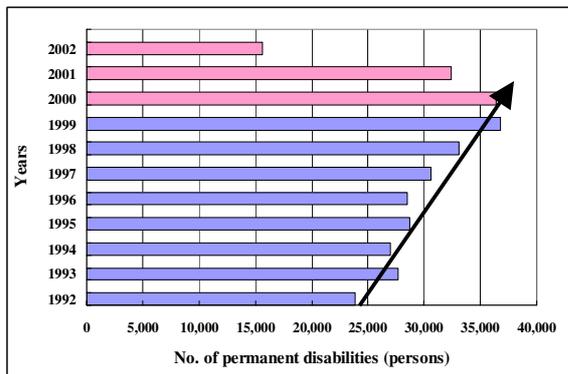


Figure 4 Annual trends in the number of persons with permanent disabilities

State of occurrence of major and minor permanent disabilities

As for the number of victims of permanent disabilities from 1992 to 2002, we have classified their ratings into four classes (Grades 1-3: severe permanent disabilities, Grades 4-8, Grades 9-11, and Grades 12-14). At the same time, we have picked out the victims of high- (Grades 1-3) and low-severity (Grade 12-14) permanent disabilities from the four classes, and the Figure 5 B), A) shows the trend by year. Please refer to the appendix for an overview of the rating of permanent disabilities in the liability insurance system. Figure 4 shows that while the number of people with permanent disabilities has been on an upward trend over the past few years, minor injuries have had a higher tendency than severe injuries.

From its base of 100% in 1992, the number of people with severe permanent disabilities was 123% in 1999, indicating that during that time about 45 people sustained high-severity permanent disabilities each year as a result of traffic accidents. In contrast, the number of low-severity permanent disabilities grew from a base of 100% in 1992 to 176% in 1999, indicating that during that time about 1,600 people sustained low-severity permanent disabilities each year as a result of traffic accidents.

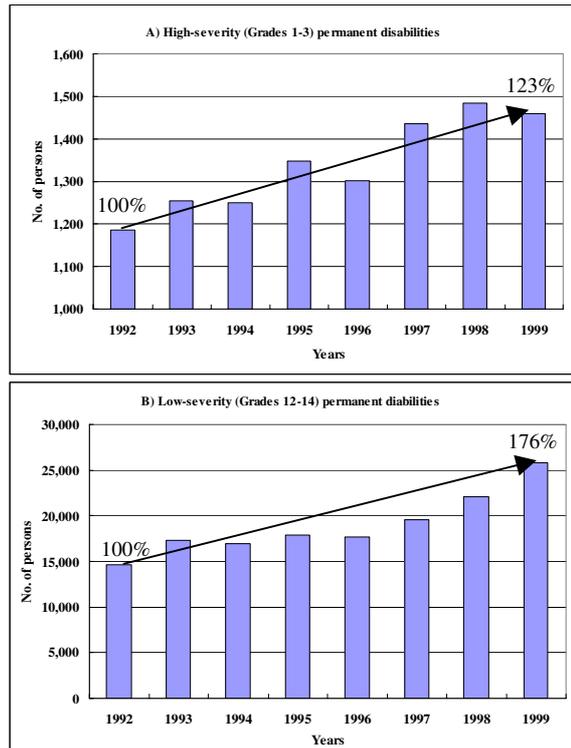


Figure 5 Trends in high-severity (A: Grades 1-3) and low-severity (B: Grades 12-14) permanent disabilities

Annual trend in rating and series (symptoms) of permanent disabilities

The number of severe permanent disabilities (Grades 1-3) has shown an increasing trend. However, since the increase in minor permanent disabilities (Grades 12-14) is more significant, the component of severe permanent disabilities has been in a decreasing trend annually. Permanent disabilities of composite or equivalent symptom have been decreasing, and the occurrence of multiple permanent disabilities has been decreasing. This suggests that the types of personal injuries at the time of traffic accidents have been changing, which may imply that the improvements on in-car equipment and car body design structure have had an effective influence.

The permanent disabilities series (symptoms) is classified into (1) nervous system, (2) composite or equivalent symptom, and (3) symptoms other than (1) and (2). Their yearly trends are shown together with the number of traffic accident victims in Figure 6.

The numbers of permanent disabilities related to symptoms of the nervous system have shown an increasing trend. In 1992, for example, there were 7,220 occurrences of such injuries (component of 29.3%), but by 1999 that figure had nearly doubled to 17,899 occurrences, and the component also grew, to 37.3%.

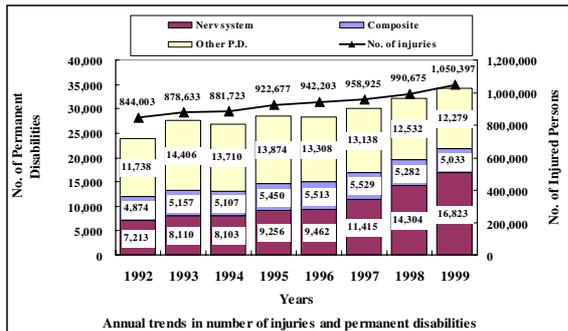


Figure 6 Annual trends in number of permanent disabilities by symptom

Occurrence of permanent disabilities by type of accident

The trends in the number of people sustaining permanent disabilities are compared with the number of fatal and injury accidents by type of accident, and also by year. Figure 7a shows the number of fatal and injury accidents where permanent disabilities occurred in 1992. Figure 7b shows the number of fatal and injury accidents where permanent disabilities occurred in 1999.

In the fatal and injury accidents in 1992 and 1999, while the number of fatal cases decreased in every accident type, the number of minor injuries caused by rear-ends collisions increased remarkably. On the other hand, looking at the types of accidents that have caused permanent disabilities, we can see that in 1999, there was a notable increase in permanent disabilities caused by minor rear-end collisions as compared with 1992, as well minor injuries caused by minor front-end collisions. While the number of permanent disabilities resulting from overall severe injuries is decreasing in trend, the number of permanent disabilities resulting from severe and minor injuries in car-to-car or other types of accidents is notably increasing.

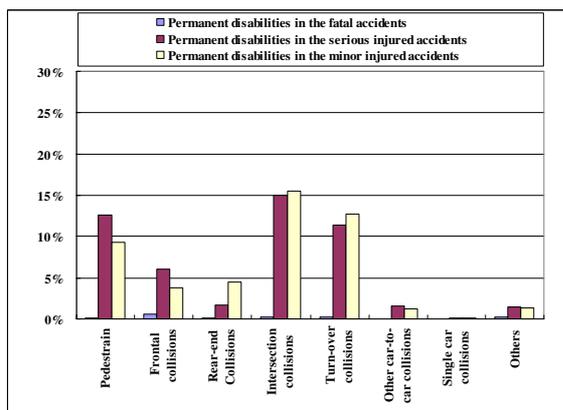


Figure 7a Frequency rate of permanent disabilities classified by types of accidents in 1992

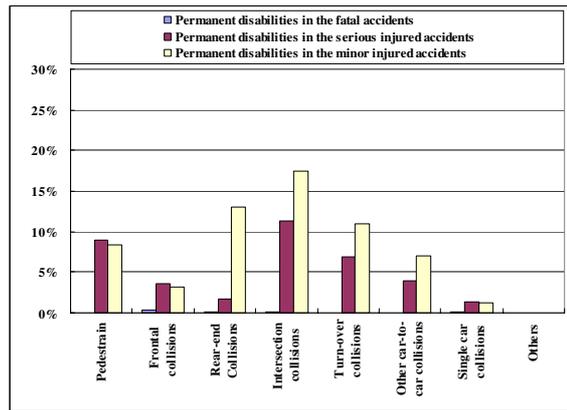


Figure 7b Frequency rate of permanent disabilities classified by types of accidents in 1999

Occurrence of permanent disabilities by type of group

The trends in the occurrence of permanent disabilities are classified by group, and also by region of primary injury. Then the yearly changes are compared. Figure 8a shows the number of occurrences of permanent disability by group and by region of primary injury in 1992. Figure 8b shows the number of occurrences of permanent disability by group and by region of primary injury in 1999.

The group seeing the biggest change in yearly figures for occurrence of permanent disabilities were occupants of four-wheeled vehicles, whose injuries were primarily in the neck region. In 1992, there were 1,500 persons in four-wheeled vehicles receiving permanent neck injuries, but by 1999 this figure had nearly tripled, to 7,000 persons (Figs. 8a and 8b). Following the neck injuries, the most common permanent disabilities for this type of vehicle were in the legs, then the head, but these latter two types of injuries have not increased as much as neck injuries. Groups that have had little change in neck injury occurrence are motorcyclists, bicyclists, and pedestrians; in all of these groups, the most common type of permanent disability is in the legs (in the order of motorcyclists, bicyclists, pedestrians), followed by head injuries (pedestrians, bicyclists, motorcyclists).

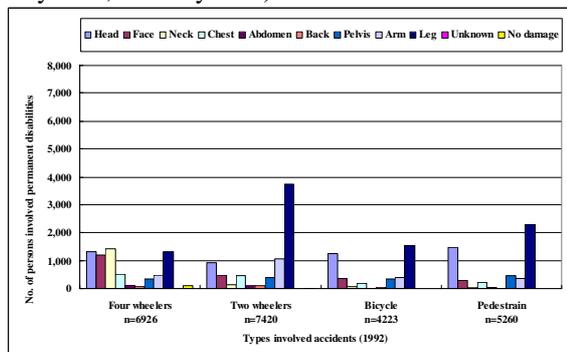


Figure 8a Number of occurrences of permanent disabilities and region of disability among different groups, 1992

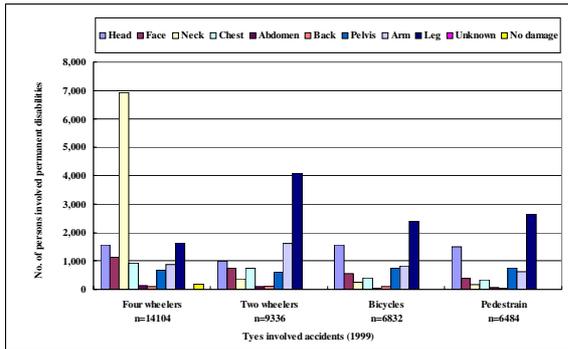


Figure 8b Number of occurrences of permanent disability and region of disability among different regions, 1999

Occurrence of fatalities, permanent disabilities, and injuries by gender

Generally speaking, women tend to sustain permanent disabilities more often than men, with the frequency of occurrence being about 2-5% higher, especially in the young and middle age groups (Figs, 9a, 9b). However, in the 55 and older age group, men and women tend to have a similar rate of permanent disability occurrence. For this trend, it should be noted that these data are from 1999, and there were fewer women than men of this age group who had driver's licenses, so these figures may just be a reflection of fewer chances to drive for women.

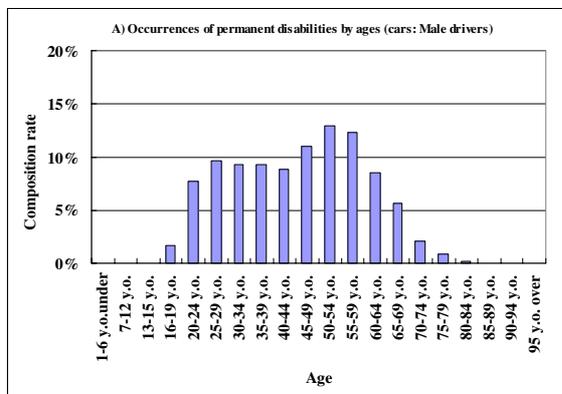


Figure 9a Occurrence of permanent disabilities in men by age group (drivers in passenger cars)

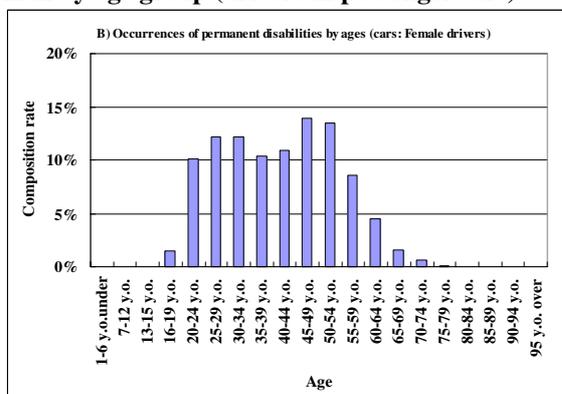


Figure 9b Occurrence of permanent disabilities in women by age group (drivers in passenger cars)

Relation between vehicle structure and permanent disabilities

It has been noted that in accidents involving four-wheeled vehicles, a relatively large number of injuries occur in the legs. Here are some figures from 1995 to 1999 regarding the 2,792 drivers who sustained permanent disabilities (First guilty party: 314 persons; Second guilty party: 2,478 persons)

In accidents involving collisions between SUVs and vans in which seat belts were in use and/or airbags inflated, there is a growing number of deaths, serious injuries, minor injuries, and permanent disabilities sustained by persons in vans. In collisions involving SUVs and regular passenger cars there are many fatalities and serious injuries, but not so many minor injuries and permanent disabilities as compared with vans. Thus, the rate of occurrence of permanent disabilities varies by type of vehicle.

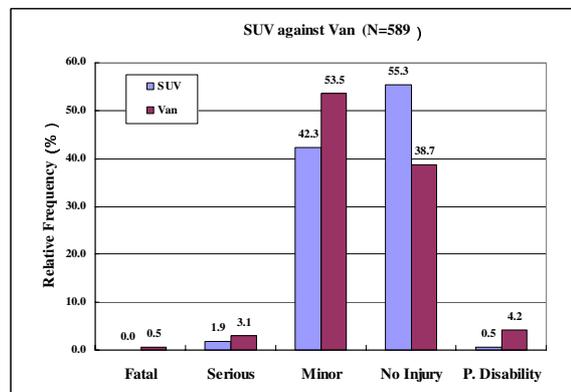


Figure 10a Differences in degrees of seriousness of injuries sustained in collision with different types of vehicle (SUV against van)

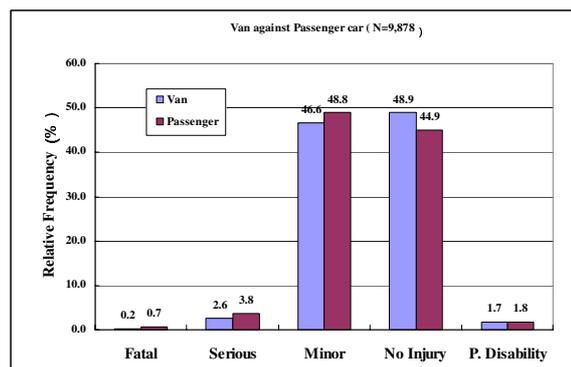


Figure 10b Differences in degrees of seriousness of injuries sustained in collision with different types of vehicle (van against ordinary passenger car)

Relation between equipment designed to protect drivers and passengers and permanent disabilities

The number of fatalities of a passenger car driver wearing a seat belt with an airbag inflated is 374 (1.16%), that of severe injuries is 2,785 (8.66%), and that of minor injuries is 29,007 (90.18%).

Among them, the number of people with permanent disabilities is 892 (2.77%). In contrast, the number of fatalities of a passenger car driver not wearing a seat belt with an airbag inflated is 662 (11.95%), that of severe injuries is 995 (17.96%), and that of minor injuries is 3,882 (70.08%). Among them, the number of people with permanent disabilities is 146 (2.64%) (Table 2). On the other hand, the number of fatalities of minivan drivers wearing seat belts with an airbag inflated is 61 (1.04%), that of severe injuries is 600 (10.18%), and that of minor injuries is 5,232 (88.78%). The number of people with permanent disabilities is 183 (3.11%). In contrast, the number of fatalities of minivan drivers not wearing seat belts with an airbag inflated is 97 (10.05%), that of severe injuries is 192 (19.90%), and that of minor injuries is 676 (70.05%). The number of people with permanent disabilities is 26 (2.69%) (Table 2).

Figure 11a shows a similar trend in the occurrence of fatality, severe injury, non-severe injury, and permanent disability both for passenger car and minivan drivers. In particularly, wearing a seatbelt is 10 times as effective as not wearing it in preventing fatal accidents.

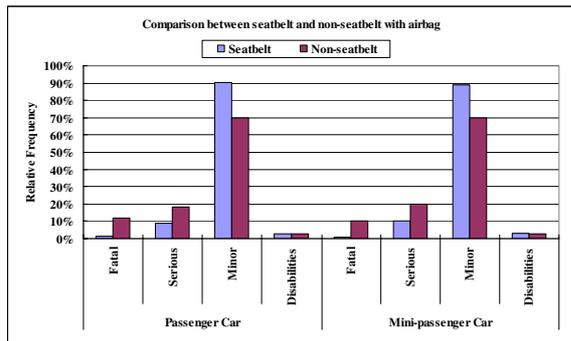


Figure 11a Comparison of the effect of wearing a seat belt and not wearing it when an airbag inflated (frontal collision)

While the non-fatal rate is high when a seat belt was used and an airbag inflated, it appears that the component of permanent disabilities is also high. On the other hand, even if an airbag inflated, the fatality rate did not drop when a seat belt was not used, and the component of fatality stayed high, which may seem to result in a relatively low proportion of permanent disabilities. When an airbag didn't inflate, the non-fatal rate became high due to wearing a seat belt (Figure 11b). However, the component of permanent disabilities is not as high as when an air bag inflated. On the other hand, when a seat belt is not in use, a driver is more likely to suffer permanent disability. This may be because when a driver's body is not secured, it can collide with various parts of the inner wall of a vehicle (Table 3).

Accordingly, usage of a driver restraint system such as wearing a seat belt or inflation of an airbag can produce an effect to reduce fatality, but at the same time, it can increase the occurrence of permanent disabilities. However, this trend should be examined further from the aspects of the area receiving permanent disabilities, the type of the disability, etc. after the influences of driver's gender, difference of collision speed, and others are adjusted.

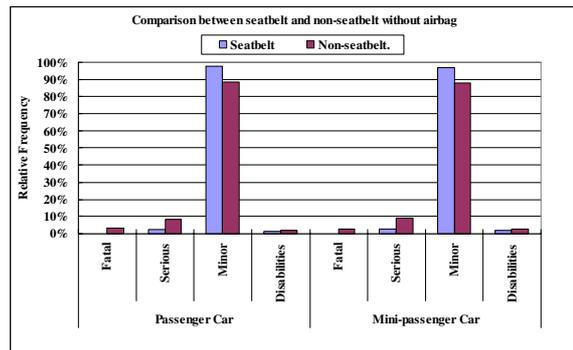


Figure 11b Comparison of the effect of wearing a seat belt and not wearing it when an airbag did not inflate (frontal collision)

Table 2 The number and component of drivers wearing a seat belt and those not wearing one by degree of seriousness of injuries sustained in a frontal collision when an airbag inflated

	Airbag deployment									
	Passenger Car				Total	Passenger Car				Total
	Fatal	Serious	Minor	Disabilities		Fatal	Serious	Minor	Disabilities	
Seatbelt	374 (0.16%)	2,785 (8.66%)	29,007 (90.18%)	892 [2.88%]	32,166	61 (1.04%)	600 (10.18%)	5,232 (88.78%)	183 [3.11%]	5,893
Non-seatbelt	662 (11.95%)	995 (17.96%)	3,882 (70.08%)	146 [2.64%]	5,539	97 (10.05%)	192 (19.90%)	676 (70.05%)	26 [2.69%]	965

Table 3 The number and component of drivers wearing a seat belt and those not wearing it by degree of seriousness of injuries sustained in frontal collision when an airbag didn't inflate

	No airbag									
	Passenger Car				Total	Passenger Car				Total
	Fatal	Serious	Minor	Disabilities		Fatal	Serious	Minor	Disabilities	
Seatbelt	1,671 (0.17%)	21,754 (2.18%)	975,691 (97.66%)	15,889 [1.50%]	999,116	505 (0.21%)	6,887 (2.80%)	238,307 (96.99%)	4,334 [1.76%]	245,699
Non-seatbelt	2,919 (3.33%)	7,099 (8.09%)	77,761 (88.59%)	1,754 [2.00]	87,779	716 (2.78%)	2,360 (9.17%)	22,655 (88.05%)	655 [2.55%]	25,731

CONCLUSIONS

In an effort to use permanent disability data to analyze, from a new perspective, the relationship between automobile accidents and personal injuries, matching was made between integrated traffic accident data and liability insurance permanent disability data. Also an attempt was made to construct a permanent disability database. Furthermore, to get a clear understanding of personal injuries, particularly of the occurrence of permanent disabilities, we examined the effects of the crashworthiness and vehicle interior & exterior equipment designed for occupant protection and vulnerable users.

The following results were obtained:

- 1) A total of 275,434 of 370,287 accidents (persons) could be matched between the integrated traffic accident data and the permanent disability data, for a matching rate of 74.4%.
- 2) It takes about 5-6 years to confirm the severity of about 98% of the permanent disabilities in automobile traffic accidents.
- 3) The number of people with permanent disabilities tends to increase year by year. This trend is more pronounced in the low-severity group (Grades 12-14) than in the high-severity group (Grades 1-3). In the years between 1992 and 1998, the number of people with high-severity permanent disabilities increased by 23% (equivalent to about 45 new high disabled persons each year). In contrast, the number of low-severity disabilities increased by 75% during the same time period (equivalent to about 1,600 new low disabled persons each year).
- 4) There has been a remarkable increase in low-severity permanent disabilities caused by rear-end and side collisions. There has also been a remarkable increase in both high- and low-severity permanent disabilities caused by other types of vehicle-to-vehicle collisions.”
- 5) The group showing the greatest change over the years is the four-wheeled vehicles, where the most common type of injury is in the neck. From 1992 to 1999, the number of permanent disabilities sustained in four-wheeled vehicle accidents more than tripled, going from about 1,500 persons (incidents) to about 7,000 persons (accidents).
- 6) Women tended to be more susceptible to permanent disabilities than men. For example, disabling injuries to young and middle-aged women drivers (20-55 years of age) were 2-5% higher than to men in the same age group.
- 7) The degree of bodily injury varied by types of vehicle. Serious injuries were highest for vans, followed by regular passenger cars and SUVs. Van accidents also tended to show a high rate of permanent disabilities.
- 8) While the non-fatal rate is high when a seat belt was used and an airbag inflated, it appears that the component of permanent disabilities is also high.

Using the results from the present study, we would like to do a more detailed analysis of the occurrence of permanent disabilities in an effort to obtain more concise results about the effectiveness of automobile safety features and to come up with relevant and related topics and issues.

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Rating of permanent disabilities

Overview of the rating of permanent disabilities in the liability insurance system.

Grading of Permanent Disabilities

Grade	Permanent disability
1st grade	(1) Loss of sight of both eyes
	(2) Loss of functions of both mastication and speech
	(3) Loss of both upper limbs upwards of the elbow joint
	(4) Total loss of the functions of both upper limbs
	(5) Loss of both lower limbs upwards of the knee joint
	(6) Total loss of the functions of both lower limbs
2nd grade	(1) Loss of sight of one eye and partial loss of vision in the other eye to 0.02 or
	(2) Partial loss of vision in both eyes to 0.02 or less
	(3) Loss of both upper limbs upwards of the wrist joint
	(4) Loss of both lower limbs upwards of the ankle joint
3rd grade	(1) Loss of sight of one eye and partial loss of vision in the other eye to 0.06 or
	(2) Loss of functions of either mastication and speech
	(3) Severe disabilities in the functions of the nervous system or in mentality, causing inability to engage in work for the remainder of their lives
	(4) Severe disabilities in the functions of the thorax and abdominal organs, causing inability to engage in work for the remainder of their lives
	(5) Loss of all of thumbs and fingers on both hands
4th grade	(1) Partial loss of vision in both eyes to 0.06 or less
	(2) Severe disabilities in the functions of both mastication and speech
	(3) Total loss of hearing in both ears
	(4) Loss of one lower limbs upwards of the elbow joint
	(5) Loss of one lower limbs upwards of the knee joint
	(6) Loss of the use of all of thumbs and fingers on both hands
	(7) Loss of both legs upwards of the Lisfranc's joints
5th grade	(1) Loss of sight of one eye and partial loss of vision in the other eye to 0.1 or
	(2) Severe disabilities in the functions of the nervous system or in mentality, causing inability to engage in anything but very light work
	(3) Severe disabilities in the functions of the thorax and abdominal organs, causing inability to engage in anything but very light work
	(4) Loss of one upper limbs upwards of the wrist joint
	(5) Loss of one lower limbs upwards of the ankle joint
	(6) Total loss of the use of one upper limb
	(7) Total loss of the use of one lower limb
	(8) Loss of all toes on both feet
6th grade	(1) Partial loss of vision in both eyes to 0.1 or less
	(2) Severe disabilities in the functions of either mastication and speech
	(3) Partial loss of hearing in both ears such a degree that they are unable to hear a loud voice unless it is close to the ear
	(4) Total loss of hearing in one ear and partial loss of hearing in the other ear to such a degree of inability to hear a speaking voice at a distance of 40
	(5) Severe deformity or motor impediment in the spinal column
	(6) Loss of the use of two of three major joints in one upper limb
	(7) Loss of the use of two of three major joints in one lower limb
	(8) Loss of thumb and all fingers on one hand or loss of four digits including the thumb and index finger of one hand
7th grade	(1) Loss of sight of one eye and partial loss of vision in the other eye to 0.6 or
	(2) Partial loss of hearing in both ears to such a degree of inability to hear a normal speaking voice at a distance 40 centimeters or more
	(3) Total loss of hearing in one ear and partial loss of hearing in the other ear to such a degree of inability to hear a normal speaking voice at a distance of 1
	(4) Disabilities in the functions of nervous system or in mentality, causing inability to engage in anything but light work
	(5) Disabilities in the functions of the thorax and abdominal organs, causing inability to engage in anything but light work
	(6) Loss of thumb and index finger on one hand, or loss of three or more digits including either the thumb or index finger on one hand
	(7) Loss of the use of thumb and four fingers on one hand, or loss of the use four digits including the thumb and index finger on one hand
	(8) Loss of one leg upwards of the Lisfranc's joints
	(9) Pseudoarthrosis with a severe motor impediment in one upper limb
	(10) Pseudoarthrosis with a severe motor impediment in one lower limb
	(11) Loss of the use of all toes on both feet
	(12) Severe deformity in female's appearance
	(13) Loss of both testicles
8th grade	(1) Loss of sight of one eye or partial loss of vision in the other eye to 0.02 or
	(2) Motor impediment of the spinal column
	(3) Loss of thumb and one finger on one hand
	(4) Loss of the use of the thumb and index finger on one hand, or loss of use of thumb and two or more fingers including the index finger on one hand
	(5) Shortening of one lower limb by five centimeter or more
	(6) Loss of the use of one of three major joints in one upper limb
	(7) Loss of the use of one of three major joints in one lower limb
	(8) Pseudoarthrosis in one upper limb
	(9) Pseudoarthrosis in one lower limb
	(10) Loss of all toes on one foot
	(11) Loss of a spleen or one kidney on one side

9th grade	(1) Partial loss of vision in both eyes to 0.6 or less
	(2) Partial loss of vision in one eye to 0.6 or less
	(3) Hemianopsia, contraction of the visual field or distortion of the visual field in both eyes
	(4) Severe loss in both eyelids
	(5) Loss of nose with severe disabilities in the functions thereof
	(6) Disabilities in the functions of both mastication and speech
	(7) Those who have a partial loss of hearing in both ears to such a degree of inability to hear a normal speaking voice at a distance of one meter or more
	(8) Partial loss of hearing in one ear to such a degree of inability to hear a loud voice unless it is close to the ear, and partial loss of hearing in the other ear to such a degree of inability to hear a normal speaking voice at a distance one
	(9) Total loss of the hearing in one ear
	(10) Disabilities in the functions of nervous system or in mentality, causing inability to engage in anything but limited work to considerable extent
	(11) Severe disabilities in the functions of the thorax and abdominal organs, causing inability to engage in anything but limited work to considerable extent
	(12) Loss of thumb on one hand, loss of the index finger and one other finger on one hand, or loss of three digits except the thumb and index finger on one
	(13) Loss of the use of thumb and one finger on one hand
	(14) Loss of two or more toes on one foot including big toe
	(15) Loss of the use of all toes on one foot
	(16) Severe disabilities in the genital organs
10th grade	(1) Partial loss of vision in both eyes to 0.1 or less
	(2) Disabilities in the functions of either mastication and speech
	(3) Dental prostheses on fourteen teeth or more
	(4) Partial loss of hearing in both ears to such a degree as to make it difficult to hear a normal speaking voice at a distance one meter or more
	(5) Partial loss of hearing in one ear to such a degree of inability to hear a loud voice unless it is close to the ear
	(6) Loss of the index finger on one hand, or loss of two digits except the thumb and index finger on one hand
	(7) Loss of the use of the thumb on one hand, loss of the use of the index finger and one finger on one hand, or loss of the use of three digits except the thumb and index finger on one hand
	(8) Shortening of one lower limb by three centimeters or more
	(9) Loss of the big toe on one foot, or loss of four toes except the big toe on
	(10) Severe disabilities in the functions of one of three major joints of one
	(11) Severe disabilities in the functions of one of three major joints of one
11th grade	(1) Severe disabilities in focusing or motor impediments in both eyeballs
	(2) Severe motor impediment in both eyelids
	(3) Severe residual loss in one eyelids
	(4) Dental prostheses on ten teeth or more
	(5) Partial loss of hearing in both ears to such a degree of inability to hear a low voice at a distance one meter or more
	(6) Partial loss of hearing in one ear to such a degree of inability to hear a normal speaking voice at a distance of forty centimeters or more
	(7) Deformity of the spinal column
	(8) Loss of either a middle finger or ring finger on one hand
	(9) Loss of the use of the index finger on one hand, or loss of the use of two digits except the thumb and index finger on one hand
	(10) Loss of the use of two or more toes on one foot including big toe
12th grade	(11) Disabilities in any thorax or abdominal organs
	(1) Severe disabilities in focusing or motor impediments in one
	(2) Severe motor impediment in one eyelid
	(3) Dental prostheses on seven teeth or more
	(4) Loss of major part of auricle in one ear
	(5) Severe deformity of clavicle, sternum, ribs, scapula or pelvis
	(6) Disabilities in the functions of one of three major joints of one upper limb
	(7) Disabilities in the functions of one of three major joints of one lower limb
	(8) Deformity of a long pipe bone
	(9) Loss of the use of either a middle finger or ring finger on one hand
	(10) Loss of the second toe on one hand, loss of two toes including the second toe on one foot, or loss of all of third to fifth toes on one foot
	(11) Loss of the use of big toe or four other toes except the big toe on one foot
	(12) Obstinate nervous symptoms in affected parts
	(13) Severe deformity in male's appearance
(14) Deformity in female's appearance	
13th grade	(1) Partial loss of vision in one eye to 0.6 or less
	(2) Hemianopsia, contraction of the visual field, or distortion of the visual field in one eye
	(3) Partial loss of eyelids or residual baldness of eyelashes in both eyes
	(4) Dental prostheses on five teeth or more
	(5) Loss of the little finger on one hand
	(6) Loss of part of the bones of thumb on one hand
	(7) Loss of part of the bones of index finger on one hand
	(8) Inability to bend and stretch the last joint of index finger on one hand
	(9) Shortening of one lower limb by one centimeters or more
	(10) Loss of one or two of the third to fifth toes on one foot
14th grade	(11) Loss of the use of the second toe on one foot, loss of the use of two toes including the second toe on one foot, or loss of the use of all of third to fifth
	(1) Loss in a part of one eyelid, or residual baldness of eyelashes in one eye
	(2) Dental prostheses on three teeth or more
	(3) Partial loss of hearing in one ears such a degree of inability to hear a low voice at a distance of one meter or more
	(4) Palm-size ugly scar(s) on the exposed part of one upper limb
	(5) Palm-size ugly scar(s) on the exposed part of one lower limb
	(6) Loss of the use of the little finger on one hand
	(7) Loss of part of the bones of digit(s) other than the thumb and index finger on one hand
	(8) Inability to bend and stretch the last joint of digit(s) other than thumb and index finger on one hand
	(9) Loss of the use of one or two of the third to fifth toes on one foot
	(10) Nervous symptoms in affected parts
(11) Deformity in male's appearance	