

Studies regarding to the questions
from 57th session of GRSP

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The cost benefit by mandatory implementation of seat belt reminder in Europe

1. Estimated number of EU28 casualties that would be influenced by action scenario (Mid estimate: 2015-2025)

Vehicle type	M1		M2 & M3		N1		N2&N3	
	Front seat passenger	Rear seat passenger	Driver	Passenger	Driver	Passenger	Driver	Passenger
EU28 Fatal	27	13	1	68	29	8	33	12
EU28 Serious	336	189	7	1,018	98	57	141	56
EU28 Slight	700	768	117	2,696	295	119	926	353

2. Monetised value and break-even costs per vehicle and per seat for EU28 casualties influenced by action scenario (Mid estimate: 2015-2025)

Vehicle type	M1		M2 & M3		N1		N2&N3	
	Front seat passenger	Rear seat passenger	Driver	Passenger	Driver	Passenger	Driver	Passenger
EU28 Monetised value (€M)	€117	€68	€4	€337	€65	€24	€88	€33
EU 28 Break even value (€)per vehicle	€8	€1	€31	€692	€31	€12	€22	€5
EU 28 Break even value (€)per seat	€8	<€1	€31	€23 ^{※2}	€31	<€12	€22	<€5

※2 Assuming average number of seats is 30

Seat belt use rates of driver's seat and penetration rate after SBR required in Japan

1. Seat belt use rates of driver's seat and penetration rate of SBR (2008~2013※¹)

	2008	2009	2010	2011	2012	2013
Seat belt use rates	95.9%	96.6%	97.3%	97.5%	97.7%	98.0%
Penetration rate of SBR	2.2%	8.8%	15.9%	21.8%	29.2%	36.2%

*1 Since September 2008, it is mandatory for current production vehicles to be fitted with SBR in the driver's seat.

2. Effects of seat-belt use to reduce fatalities

(1) Fatality rates(*1) of seat belt users/non users in Japan (2013)

	Use	Non use	Comparison
Front passenger seats	0.15%	2.97%	19.8 times
Rear passenger seats	0.13%	0.58%	4.5 times

*1 Fatality rates = $\frac{\text{The number of deaths}}{\text{The total number of deaths, sever injuries and injuries}}$

(2) The number of fatalities not using seat belts in Japan (2013)

	Non use
Front passenger seats	60
Rear passenger seats	119

If they used seat belts...

$60 / 19.8 = 3 (-57)$

$119 / 4.5 = 26 (-93)$

Cost benefit analysis in Korea

Cost and Benefit



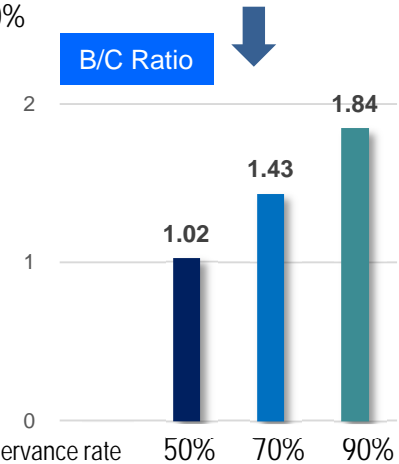
- Vehicle registration number
- Motor Vehicle accidents (numbers and deaths)
- SBR fitment rate
- Safety-belt wearing rate
- Casualty valuation value
- SBR fitment cost for single vehicle

- Safety-belt effectiveness: Elvik & Vaa (2009)
- Casualty change: Evans Model(1991)
- Casualty estimation model(Korea)

- SBR fitment rate: 100%
- Effectiveness value for SBR (Observance rate): 50%, 70%, 90%

- Present value change of estimated cost and benefit

- Target year: 2024
- Predicting annual new registration of vehicle
- Casualty estimation according to safety belt wearing rate
- Casualty value calculation/SBR fitment cost calculation



Safety-belt effectiveness: Elvik & Vaa(2009)

Effectiveness in mitigating fatal, serious and minor injuries (N1) in all accident types (Elvik & Vaa, 2009)

	Driver		Front seat passenger		Rear seat passenger	
	Best estimate	95% CI	Best estimate	95% CI	Best estimate	95% CI
Fatal injuries	50%	± 5%	45%	± 10%	25%	± 10%
Serious injuries	45%	± 5%	45%	± 15%	25%	± 15%
Minor injuries	25%	± 5%	20%	± 5%	20%	± 15%
All injuries	28%	± 5%	23%	± 6%	21%	± 15%

Casualty change: Evans Model(1991)

$$F = \frac{E(u_f - u_i)}{1 - Eu_i}$$

- F= Fractional reduction in casualties
- E= Seat belt effectiveness
- u_f = Final belt wearing rate
- u_i = Initial belt wearing rate

Scenarios	Observance rate	Wearing Rate			
		Driver	Front seat passenger	Rear seat passenger	
Do-nothing	0	82.1%	82.1%	22.5%	Initial belt wearing rate
#1	50%	91.1%	91.1%	61.3%	Final belt wearing rate
#2	70%	94.6%	94.6%	76.8%	
#3	90%	98.2%	98.2%	92.3%	

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Current Status of Seat Belt Crackdown in Japan

Under Japan's Road Traffic Act, driving is prohibited unless seat belts are used in all occupied seats. Violators are given 1 basic point under the administrative penalty points scheme, with an accumulation of 6 points or more leading to suspension of the license and of 15 points or more leading to revocation of the license.*

* In the case of rear seats, violations are subject to the administrative penalty, only if made on expressways ("national expressways" and "roads for motor vehicles only").

Road Traffic Act, Article 71-3

1. Drivers of motor vehicles (excluding heavy motorcycles and ordinary motorcycles; hereinafter the same shall apply in this article) must not drive their vehicles without using seat belts whose installation in the vehicle is required by Chapter 3 of the Road Trucking Vehicle Act as well as the order provision under the Act (hereinafter "seat belts"). ...

2. Drivers of motor vehicles must not drive their vehicles where any occupant not wearing a seat belt is being seated in any seat (limited to those seats whose installation in the vehicle is required by law; hereinafter the same shall apply in this clause), except the driver's seat. ...

The National Police Agency is not only promoting awareness of seat belt use through periodic traffic safety campaigns, but also disseminating the related information through websites, posters, etc.

In the JNCAP, for the purpose of reducing the number of fatalities through increasing the rate of use of seat belts for occupants other than drivers, the status of installation of seat belt reminder (SBR) systems as well as their operational requirements (timing, duration and type of warning, indicator position, etc.) are checked for seats other than the driver's seat. In addition, self-supporting seat belt buckles are found to be effective in the evaluation on the usefulness of seat belts in rear seats.

Fine for enhancing the safety belt wearing rate in Korea

▣ Road traffic act

- ✓ Safety belt use in front seats has been compulsory since 1990 on all roads.
 - ✓ The use of rear safety belts **on motorways** was made compulsory in 2008.
 - ✓ Violation penalty: **30,000 won (about \$25)**
- ★ Proposed amendment of road traffic act (**July 2015**)
: compulsory use of safety belts for all seats **on all roads**.

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- ✓ Benefits outweigh costs in our regions and SBR has great lifesaving potentials.
- ✓ From seatbelt use data it is clear that enforcement is not equal in all countries and may depend on priorities for police forces and public protection.
- ✓ We believe SBR can help educate drivers by making them aware.
- ✓ We should improve seatbelt wearing ratio by measures other than to rely only on police enforcement, especially by SBR.