

Proposal for amendments to UN R16: **Mandatory fitting of safety-belt reminder**

Background

- ✓ The safety-belt usage rate in Korea stands at about 85% for front seats, but the rate is 19% for rear seats.
- ✓ But, European countries are high. (IRTAD,2013)

IRTAD, 2013	Belt wearing rate, front seats	Belt wearing rate, rear seats
Country		
France	98%	84%
Germany	98%	98%
UK	95%	89%
Korea	85%	19%

- ✓ Generally, vehicle penetration rate in many Asia countries is lower than European countries, and we presume that the occupancy rate of vehicle is higher than European countries.
- ✓ Safety-belt usage rate is generally low in many countries of Asia and we need to improve the safety-belt usage rate by the mandatory installation of the Safety-belt Reminder
- ✓ Proposal 56th session of GRSP:
The mandatory installation of the Safety-belt Reminder is extended to the rear seat.

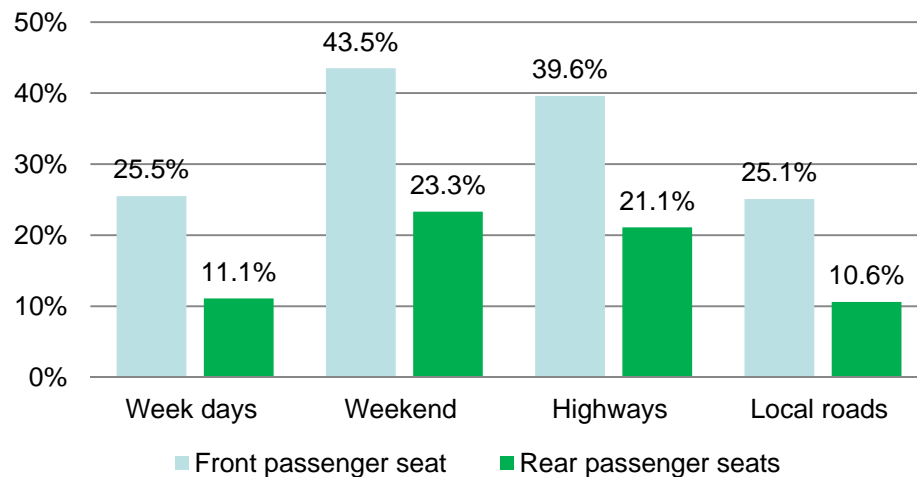
Occupancy rate of passenger car rear seat in Korea

Occupancy rate of passenger car seat (2015)

- ✓ Rear seat occupancy rate is about 0.5 times to front passenger seat.
- ✓ The occupancy rate of weekend and highways is higher.

	Front passenger seat	Rear passenger seats
Average	30.9%	14.8%
Week days	25.5%	11.1%
Weekend	43.5%	23.3%
Highways	39.6%	21.1%
Local roads	25.1%	10.6%

Occupancy Rate



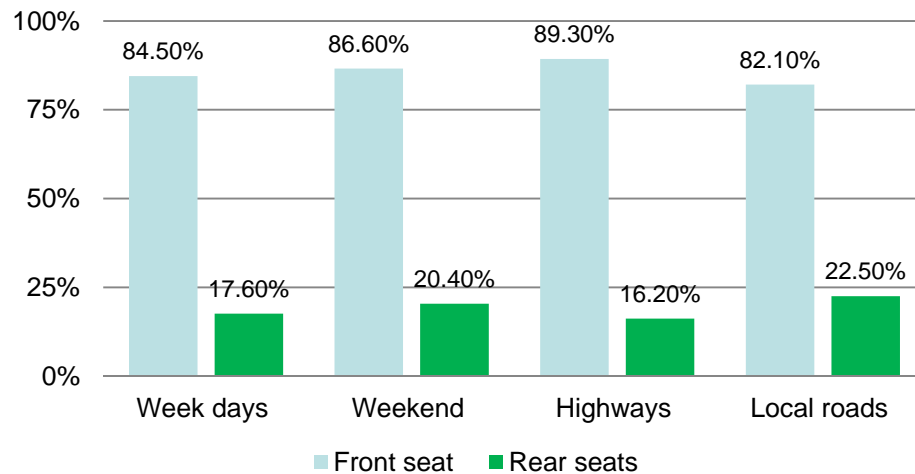
Use rate of safety-belt in Korea

Usage rate of passenger car safety-belt (2015)

- ✓ Usage rate of rear seat safety-belt is about 0.2 times to front seat.
- ✓ In highways, safety-belt usage rate for rear seat is the lowest while front safety-belt use is the highest.

	Driver seat	Front passenger seat	Rear seats
Average	89.0%	73.1%	18.9%
Week days	88.0%	70.7%	17.6%
Weekend	91.1%	76.4%	20.4%
Highways	93.1%	75.7%	16.2%
Local roads	85.0%	66.3%	22.5%

Safety-Belt Use Rate



Casualty of safety-belt non-use in Korea

■ Casualty of safety-belt non-users in Korea (2013)

	The number of fatalities [people]	The number of the injured [people]
Front driver seats	195	2,364
Front passenger seats	57 (18%)	2,266 (12%)
Rear passenger seats	58 (19%)	13,585 (75%)
Total	310	18,215

- ✓ The injured rate of safety-belt non-users on rear seat is **75%** of total injured safety-belt non-users.
- ✓ The fatality rate of safety-belt non-users on rear seat is **19%** of total fatalities safety-belt non-users.
- ✓ It is presumed that **the injury rate of unbelted rear seat passenger is higher than the injury rate of unbelted front driver and passenger.**

Effectiveness of safety-belts in Korea

■ Effectiveness of safety-belts in preventing injuries

- ✓ Test vehicle was a type of **M2** (comprising 12 seats in addition to the driver's seat).
- ✓ Test vehicle was crashed into road structures which made by concrete in velocity **80km/h**.
- ✓ Test was performed by KATRI on November, 2014.

		belted	unbelted
Male (50 th ile) on front passenger seat	Head injury risk (%)	1.2%	4.5%
	Chest injury risk (%)	5.4%	97.7% (18 times)
Female (5 th ile) on rear seat	Head injury risk (%)	1.1%	94.8% (86 times)
	Chest injury risk (%)	5.1%	2.0%

- ✓ The **chest injury risk** of unbelted male dummy on **front passenger seat** is about **18 times** to belted dummy.
- ✓ The **head injury risk** of unbelted female dummy on **rear seat** is about **86 times** to belted dummy.
- ✓ The **combined injury risk** of unbelted male dummy on **front passenger seat** is about **14 times** to belted dummy.
- ✓ The **combined injury risk** of unbelted female dummy on **rear seat** is about **16 times** to belted dummy.



Effectiveness of safety-belts in Korea

■ Cases of belted/unbelted passenger accident



03. Sep. 2014, Rollover accident

The safety-belted driver was injured, but two unbelted persons of accident car passengers were dead (one of them was ejected).



03. April. 2015, Rollover accident

School bus met with a rollover accident. Among 12 children and 3 adults involved in the accident, nobody was seriously injured or dead thanks to safety-belt



28. April. 2015, Rear-end accident

There were a rear-end accident involving three buses. 22 belted passengers were only lightly injured thanks to safety-belt
Amongst 28 unbelted passengers, 1 person was dead and the others were injured seriously



18. April. 2015, Rollover accident

Middle school student drove his father's car illegally. This driver was only lightly injured thanks to safety-belt.

Effects resulted by mandatory implementation of seat belt reminder in Japan

1. Seat belt use rates in Japan (2013)

	Driver's seats	Passenger seats	
		Front	Rear
Highways	99.4%	97.9%	68.2%
Local roads	98.0%	93.9%	35.1%

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...

$60 / 19.8 = 3 (-57)$

$119 / 4.5 = 26 (-93)$

57 + 93 = 150 people are annually expected to be saved

The cost benefit by mandatory implementation of seat belt reminder by EC

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

Proposal

■ Requirements for safety-belt reminder

	Driver's seat	Front passenger seat	Rear seat
Not fastened with ignition on	Visual warning	Visual warning	Visual warning
Not fastened with the vehicle in motion	Visual and audible warning	Visual and audible warning	Visual and audible warning (only when any belt which was fastened before the vehicle started is unfastened)

■ Applicable categories

	M1	M2	M3	N1	N2	N3
Driver's seat	Yes	Yes	Yes	Yes	Yes	Yes
Front passenger seat	Yes	Yes	Yes	Yes	Yes	Yes
Rear seat	Yes	—	—	Yes	—	—

Test procedures

Level 1 (Visual warning)

No safety-belt fastened in any seat

Turn on ignition

Check visual warning for every seat
(for [30s] on front seats,
for [60s] on rear seats)

Level 2 (Visual and audible warning)

(1-1) Test for the driver's seat

Safety-belt not fastened in the driver's seat;
Fasten safety-belts in seats other than the driver's seat

Drive the vehicle in accordance with the driving conditions
(before 25km/h, 500m, 60s)

Check visual and audible warning for the driver's seat
(warning interval [10s] within a [60s] timeframe)

(1-2) Test for the driver's seat

Safety-belt fastened in the driver's seat;
Fasten safety-belts in seats other than the driver's seat

Drive the vehicle in accordance with the driving conditions
(more than 25km/h, 500m, 60s)

Unbuckle driver's safety-belt

Check visual and audible warning for the driver's seat
(warning interval [10s] within a [60s] timeframe)

(2-1) Test for the front passenger seat

Safety-belt not fastened in the front passenger seat;
Fasten safety-belts in seats other than the front passenger seat

Drive the vehicle in accordance with the driving conditions
(before 25km/h, 500m, 60s)

Check visual and audible warning for the front passenger seat
(warning interval [10s] within a [60s] timeframe)

(2-2) Test for the front passenger seat

Safety-belt fastened in the driver's seat;
Fasten safety-belts in seats other than the driver's seat

Drive the vehicle in accordance with the driving conditions
(more than 25km/h, 500m, 60s)

Unbuckle front passenger's safety-belt

Check visual and audible warning for the front passenger seat
(warning interval [10s] within a [60s] timeframe)

Test procedures

Level 2 (Visual warning, or visual and audible warning)

(3) Test for the rear seat (to be conducted for all rear seats)

