

**Informal Group on GTR9 Phase2  
(IG GTR9-PH2)  
2<sup>nd</sup> Meeting**

**Re-examination of Number of  
Pedestrians by Injury Severity**

March 29, 2012

Japan Automobile Standards Internationalization Center (JASIC)<sup>1</sup>

# 2. Estimation of Cost Reduction due to Tibia Fracture Mitigation

GTR9-2-07r1

US - Number of Pedestrians by Injury Severity -

Injury Severity	16 YO and older	0-15 YO
Fatal	3816	276
Severe	11501	2357
Minor	31112	11399

Number of Fatal was derived from FARS(2009)

Number of Severe and Minor was derived from NASS-GES (2009)

NASS-GES data

NASS-GES Variable: INJSEV	16 YO and older		0-15 YO	
	Case	Weighted case	Case	Weighted case
No Injury (O)	6	776.4	1	15.6
Possible Injury (C)	82	11669.3	25	5439.3
Non-incapacitating Evident Injury (B)	801	19442.4	259	5959.8
Incapacitating Injury (A)	441	11501.4	89	2356.9
Fatal Injury (K)	84	2447.6	9	247.0

Number for Minor Injury

Number for Severe Injury

JPN

Injury Severity	16 YO and older	0-15 YO
Fatal	1372	29
Severe	6730	1277
Minor	36517	8974

All of Japanese data were derived from ITARDA (2009)  
 Fatal: Died within 24 hours from accident  
 Severe: Injury that requires 30 days or more for cure  
 Minor : injury that requires less than 30 days for cure

# Discussion at 2<sup>nd</sup> IG GTR9-PH2 Meeting

## Question raised

Does the number of pedestrians classified as “severe injury” involve MAIS1?

## Answer

- Yes, PCDS database showed that it does include MAIS1 so the data shall be re-examined
- It was also found from the PCDS database that the number of pedestrians classified as “minor injury” does include MAIS 2+

## Assumptions used for re-examination

- MAIS 1 = “Minor Injury”
- MAIS 2+ = “Severe Injury” + “Fatal Injury”
- The number of pedestrians classified as “Fatal Injury” is taken from FARS

# Re-examination of Number of Pedestrians by Injury Severity

REVISED relative to GTR9-2-07r1

## US Revised Estimation

Number of Pedestrian by MAIS and INJSEV  
(NASS-PCDS, 16YO and older)

NASS-PCDS Variable: INJSEV	Number of Pedestrian						Ratio
	MAIS 1	MAIS 2	MAIS 3	MAIS 4	MAIS 5	MAIS 6	MAIS 1
No Injury (O)	3	1	0	0	0	0	75.0%
Possible Injury (C)	64	20	5	2	0	0	70.3%
Non-incapacitating Evident Injury (B)	67	18	10	3	1	0	67.7%
Incapacitating Injury (A)	25	28	44	14	28	0	18.0%
Fatal Injury (K)	0	3	5	9	18	18	0.0%
Injured, severity unknown (U)	2	2	0	2	1	0	28.6%

Number of Pedestrian  
(NASS-GES, 16YO and older)

NASS-GES Variable: INJSEV	Case	Weighted case
No Injury (O)	6	776
Possible Injury (C)	82	11,669
Non-incapacitating Evident Injury (B)	801	19,442
Incapacitating Injury (A)	441	11,501
Fatal Injury (K)	84	2,448
Injured, severity unknown (U)	8	1,392



Estimated Number of Pedestrian by Injury Level  
(NASS-GES, 16YO and older)

NASS-PCDS Variable: INJSEV	Number of Pedestrian	
	Minor (MAIS1)	Severe + Fatal
No Injury (O)	582	194
Possible Injury (C)	8,203	3,466
Non-incapacitating Evident Injury (B)	13,162	6,280
Incapacitating Injury (A)	2,070	9,431
Fatal Injury (K)	0	2,448
Injured, severity unknown (U)	398	994
SUM	24,415	22,813

Number of Pedestrian by Injury Level

Injury Severity	16 YO and older	Definition
Fatal	3,816	number of fatality from FARS
Severe	18,997	subtract number of Fatal and Minor from total number of NASS-GES weighed data
Minor	24,415	number of MAIS1 pedestrian from NASS-GES weighed data



# Comparison of Number of Pedestrians by Injury Severity

Number of Pedestrians by Injury Level

Injury Severity	GTR9-2-07r1	Revised
Fatal	3,816	3,816
Severe	11,501	18,997
Minor	31,112	24,415

Number of pedestrians 16 YO and older

**Ignoring MAIS 1 in “Severe/Fatal Injury” and MAIS 2+ in “Minor Injury” in GTR9-2-07r1 resulted in UNDERESTIMATION of “Severe Injury”**

# Estimation of Cost Reduction due to Tibia Fracture Mitigation

REVISED relative to GTR9-2-07r1

- Number of Pedestrians with Tibia Fracture by Injury Severity -

Percentage of Tibia Fracture by Injury Severity

Injury Severity	With Tibia Fracture (%)		Without Tibia Fracture (%)	
	US	JPN	US	JPN
Fatal	32.7%	12.9%	67.3%	87.1%
Severe	22.6%	19.4%	77.4%	80.6%
Minor	0.0%	0.0%	100.0%	100.0%

Number of Pedestrians by Injury Severity

Injury Severity	16YO and older	
	US	JPN
Fatal	3,816	1,372
Severe	18,997	6,730
Minor	24,415	36,517



US Fatal : FARS  
 US Non-fatal : NASS-GES (Weighed)  
 JPN : ITARDA



Number of Pedestrians with Tibia Fracture by Injury Severity

Injury Severity	16YO and older		0-15YO	
	US	JPN	US	JPN
Fatal	1,248	177	90	4
Severe	4,293	1,306	533	248
Minor	0	0	0	0

# Estimation of Cost Reduction due to Tibia Fracture Mitigation

REVISED relative to GTR9-2-07r1

- Estimated Annual Cost due to Tibia Fracture -

Number of Pedestrians with Tibia Fracture by Injury Severity

Injury Severity	16 YO and older	
	US	JPN
Fatal	1248	177
Severe	4293	1306
Minor	0	0



Cost per Case

Country	Economic Cost	Intangible Consequences	Comprehensive Cost
US	\$169,646	\$123,008	\$292,654
JPN	\$24,650	N/A	N/A

JPN: Economic Cost includes Human Cost only

Annual Cost due to Tibia Fracture

Country	Economic Cost	Intangible Consequences	Comprehensive Cost
US	\$940,008,486	\$681,587,328	\$1,621,595,814
JPN	\$36,555,950	N/A	N/A

JPN: Economic Cost includes Human Cost only

# 2. Estimation of Cost Reduction due to Tibia Fracture Mitigation

REVISED relative to GTR9-2-07r1

- Estimated Annual Cost Reduction -  
Annual Cost due to Tibia Fracture

Country	Economic Cost	Intangible Consequences	Comprehensive Cost
US	\$940,008,486	\$681,587,328	\$1,621,595,814
JPN	\$36,555,950	N/A	N/A

JPN: Economic Cost includes Human Cost only



Annual Cost Reduction from Tibia Fracture Mitigation by Introducing FlexPLI

Country	Economic Cost	Intangible Consequences	Comprehensive Cost
US	\$542,854,901	\$393,616,682	\$936,471,583
JPN	\$21,111,061	N/A	N/A

JPN: Economic Cost includes Human Cost only



# 2. Estimation of Cost Reduction due to Tibia Fracture Mitigation

REVISED relative to GTR9-2-07r1

- Comparison with Previous Results -

	Cost per Case						# Ped w/Tib Fx	Ann. Cost Tib Fx	Coeff.	Benefit
	Human	Property	Company	Public	Intangible	Total				
JPN GTR9-1-07r1	\$44,684	N/A	N/A	N/A	N/A	\$44,684	1970	\$88M	0.825 *0.7	\$51M
JPN GTR9-2-07r1	\$24,650	N/A	N/A	N/A	N/A	\$24,650	1483	\$37M	0.825 *0.7	\$21M
US GTR9-1-07r1	\$44,684	Not Included	Not Included	Not Included	Not Included	\$44,684	3847	\$172M	0.825 *0.7	\$99M
US GTR9-2-07r1	\$126,464	\$6,407	\$3,947	\$32,828	\$123,008	\$292,654	3847	\$1,126M	0.825 *0.7	\$650M
US Revised	\$126,464	\$6,407	\$3,947	\$32,828	\$123,008	\$292,654	5541	\$1,622M	0.825 *0.7	\$936M