A Study on the Development of the Expressway Traffic Accident Damage Model in the Winter Season

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0. CONTENT

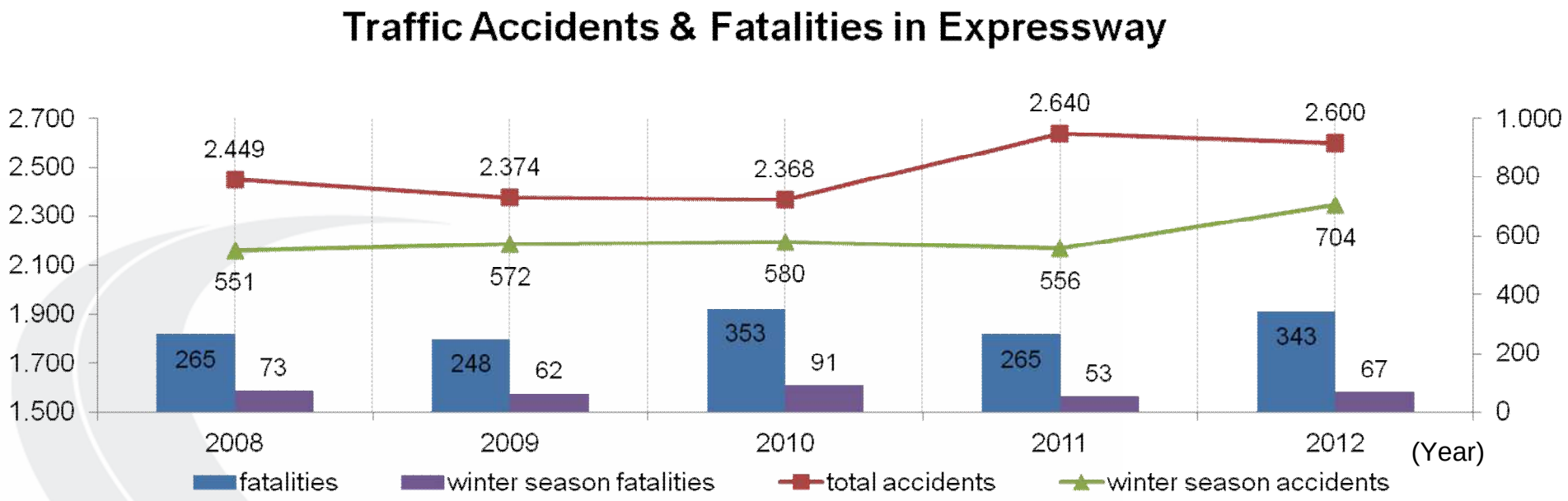
1. INTRODUCTION

Since the opening of Gyeongbu and Gyeongin Expressways in 1969, Korea expressways have extended and a total of 33 expressway lines are now operated with the total length 4,084 km.

1. INTRODUCTION

Background and Purpose of the Study

- ✓ Fatality rate per accident in the winter season is higher than others
- ✓ Analysis of major factors related to traffic accident damages



2. Related Study & Traffic Accident Damage Cost Estimation

Review of Previous Studies

- ✓ Correlation between traffic accidents and accident factors is conducted.
- ✓ Researches on traffic accident damage is not sufficient.

Traffic Accident Cost Estimation

- ✓ Personal damage cost was estimated by applying net average cost per person.
- ✓ Fatality net average cost is $390,000 per person.
- ✓ Injured person net average cost is $2,800 per person.

3. Traffic Accident Characteristics in Winter Season

Traffic Accident Occurrence (2009–2011)

✓ A total of 7,250 traffic accidents occurred and 744 people died.

✓ Traffic accidents 1,708 and 180 fatalities occurred in the winter season.

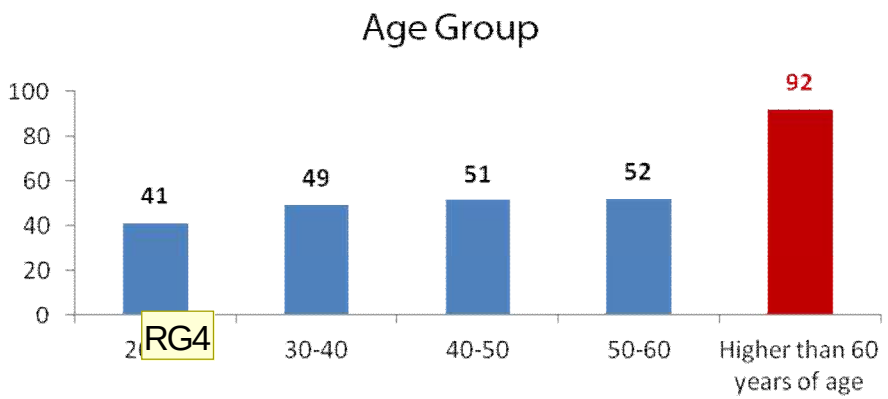
< Korea Expressway Corporation Traffic Accident Management Standards >

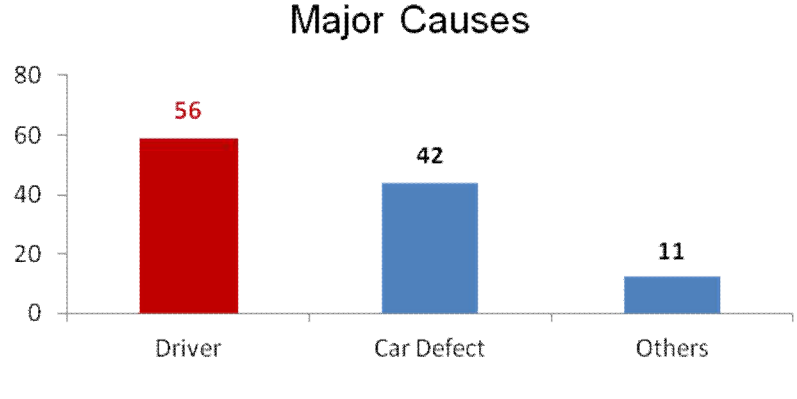
Level	Standards
Level A	More than 3 deaths, more than $9,400 of damage, more than 20 injured people, and more than 10 vehicles involved in the accident
Level B	More than 1 death, more than $2,300 of damage, more than 5 injured people, and more than 5 vehicles involved in the accident
Level C	More than 0 death, more than $280 of damage, more than 1 injured people, and more than 3 vehicles involved in the accident

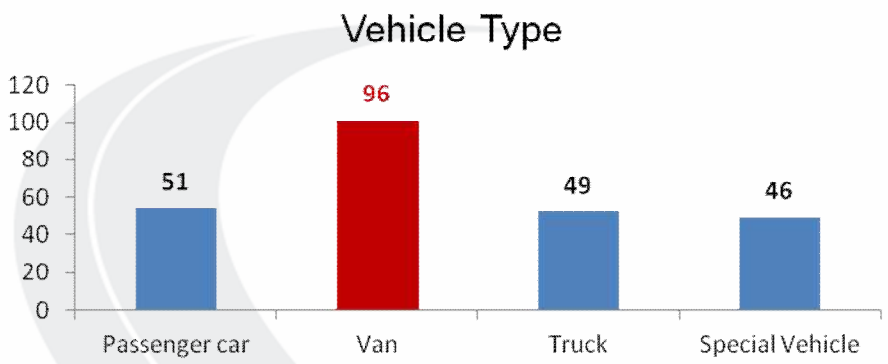
3. Traffic Accident Characteristics in Winter Season

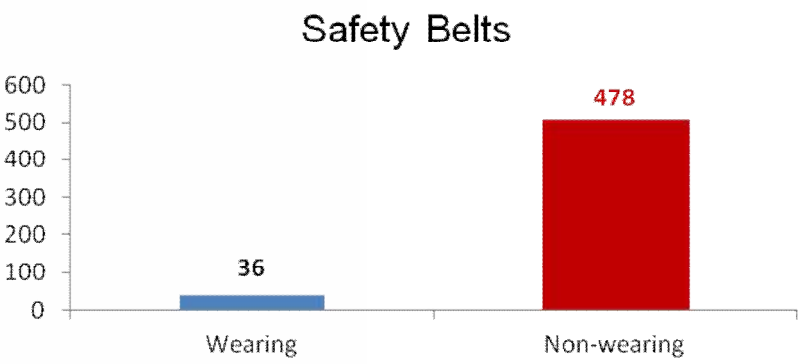
Characteristics of Winter Season Traffic Accident Cost

(Unit: $1,000)









Diapositiva 7

RG4 For ranges, the most commonly used punctuation mark is "–" (en dash) not "~".
RJ Guno; 22/01/2014

4. Construction of Winter Season Traffic Accident Damage Cost Model

Principal Component Analysis

- ✓ To understand the pattern independent variables are composed of, an analysis was conducted.
- ✓ Four representative principal components with the Eigenvalue higher than 1 and the cumulative contribution ratio higher than 60%

< Principal Component Analysis Result >

Speeding	Careless Driving	Unskilled Driving	Traffic Rule Violation
• Speeding	• Drowsy driving • Negligence in keeping eyes forward	• Excessive handling of the steering wheel	• Negligence in keeping a safe distance • Drunk driving • Improper passing

4. Construction of Winter Season Traffic Accident Damage Cost Model

Model Selection

✓ A multiple linear regression analysis model set up in this study

✓ It is the most suitable model for analysis of different factors.

Explanation of Variables

1.Accident factors: speeding, careless driving, unskilled driving, traffic rule violation

2.Accident type: vehicle type, number of accident vehicle, and accident pattern

3.Road and weather condition: vertical alignment, road shape, and weather

4.Controller's response: accident handling time

5.Driver's properties: age and non-wearing of the seat belt

4. Construction of Winter Season Traffic Accident Damage Cost Model

Analysis Result

✓ Variables that greatly influenced the traffic accident cost, such as the following:

- age, unskilled, seat belt, handling time, vehicle type, and number of vehicle

** : A significance exists at 95% confidence level

Factors		Coefficient	t-value	p-value
Accident Factor	Unskilled driving	-0.049	-2.187	0.029**
Accident Type	Vehicle type	0.082	3.545	0.000**
	The number of accident vehicles	0.143	5.696	0.000**
Driver's Reaction	Accident handling time	0.151	6.083	0.000**
Driver's Properties	Age	0.068	3.101	0.002**
	Non-wearing of the seat belt	-0.453	-20.328	0.000**
R^2		0.314		
$Adj - R^2$		0.307		

5. Conclusion

1) To fully understand the safe driving tips and to establish an information system to inform drivers about dangerous sections

2) To conduct a special safety training for drivers of vans and heavy vehicles

3) To give a prompt response to accidents by integrating the Road Management Agency

Thank you for your attention

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