Improvement of Walking Environments for the Transportation Vulnerable



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TABLE OF CONTENTS

I. Introduction

II. General

III. Problems and overseas cases

N. Improvement plans

V. Conclusions



Background

Definition

- Increase the interest of the pedestrian environment
- Generic term of transportation vulnerable: people who are the disabled, the elderly, pregnant women, children, and inconvenient to go
- The law concern about convenient movement of transportation vulnerable in Korea was Enforced in 2010
- In general: The transportation vulnerable
- USA: Elderly or disabled
- Now: The mobility handicapped (Including the elderly, pregnant women, children, person with the burden)

Background

• Progress of elderly												
(Unit												Init:%)
Year	1980	1990	1998	2000	2008	2009	2010	2018	2026	2030	2040	2050
Propor tion	3.8	5.1	6.6	7.2	10.3	10.7	11	14.3	20.8	24.3	32.5	38.2
Source An o Age A su	: The Nat aging s ed socie iper—a	tional St ociety ety: 14 ged sc	atistical : 7% % ociety:	Office 20%		2018 14.	Proporti over year 3% 2000 yea 7.2%	on of the per the age of	opulation f 65	2026 5	Vear %	



Background

Trend of	an aging po	opulation in e	each year))				
	Year		Year spent				
7%	14%	20%	7%→14%	14%→20%			
1970	1994	2005	24	11			
1864	1979	2018	115	39			
1929	1975	2028	46	53			
1942	2014	2032	72	18			
2000	2018	2026	18	8			
	Trend of 7% 1970 1864 1929 1942 2000	Trend of an aging pp Year Year 7% 14% 1970 1994 1864 1979 1929 1975 1942 2014 2000 2018	Trend of an aging population in e Year 7% 14% 20% 1970 1994 2005 1864 1979 2018 1929 1975 2028 1942 2014 2032 2000 2018 2026	Year Year 7% 14% 20% 7%→14% 1970 1994 2005 24 1864 1979 2018 115 1929 1975 2028 46 1942 2014 2032 72 2000 2018 2026 18			

Source: National Institute of Population and Social Security research

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Background

Safety for transportation vulnerable

- Build a safe pedestrian environment for the elderly
- Elderly pedestrian casualty has been increased in all cities
- Pedestrian fatality account for 61% of all accidents
- Seoul: Elderly pedestrian accidents compared to 2008 was an increase of 163
- Elderly pedestrian fatality rates is doubled high more than the general population
- The number of children killed on the roads
- In OECD countries, Korea ranks highest in the number of traffic fatalities per 100,000 children (3.1 children, Japan: 0.9 child)
- Transportation policy for pedestrian vulnerable is an important issue. But it is hard to be improved due to lack of budget.

II General

Elderly traffic accident

• Traffic fatality of elderly aged over 65 in 2008

- Japan: 49.0%
- Iceland: 33.3%
- Korea: 29.6%



- Traffic fatality of elderly aged over 65 per 100,000 people in 2008
- Korea: 34.6 people
- More than three times high compared to average of OECD countries



II General



Children traffic accident

- Child casualty composition per grade
- Elementary fatality rate: 49%
- Injury rate: 46.8%

*The majority of pedestrian death occurs in walking



II General



Walking Casualty

Traffic accident by borough in Daejeon

- Pedestrian fatality of 7 metropolitan cities: 2,137 people
- Pedestrian injury in 2009: increased to 51,381people
- Pedestrian fatality and injury in Daejeon increased 67 and 1,415 people respectively
- The number of elderly pedestrian casualty increased in all metropolitan cities

Elderly and children pedestrian casualty													
	Pedestrian casualty				Child pedestrian casualty				Edenty pedestrian casualty				
	Fatality		Injury		Fatality		Injury		Fatality		Injury		
	608	609	608	609	608	'09	608	609	608	'09	608	'09	
Seoul	258	241	10,887	11,519	12	10	1,507	1,498	97	97	1,370	1,533	
Busan	111	128	3,659	4,019	4	6	544	537	35	49	559	582	
Daegu	94	92	3,042	3,141	5	3	519	523	38	38	457	502	
Incheon	78	87	2,876	2,885	2	1	507	449	38	29	344	364	
Guangju	69	49	1,724	1,879	1	2	352	359	30	30	229	246	
Daejeon	55	67	1,321	1,415	3	2	244	250	26	28	191	196	
Yulsan	48	54	1,152	1,145	3	1	232	192	16	22	131	134	
Total	2,137	2,137	48,688	51,381	90	96	8,798	8,616	903	952	7,181	7,832	
자료: 지역별 교통사고 통계, 도로교통공단													

II Problems and overseas cases

Child pedestrian characteristics and rick elements

Child pedestrian

- Child pedestrian characteristics
- Do not look around when crossing
- Follow other's jaywalking
- Only look at one side of crossing when they cross
- Expecting that the car will be stopped
- Break into a run as soon as the light turns green
- Stopping in the crossing road
- Waiting for the green signal from the road
- Examples of problems at a school zone
- No speed hump or bump
- No segregation between pedestrian and vehicle
- Child safety problem due to illegal parking

III Problems and overseas cases



Problem

School zone



No crash barrier and illegal parking



Inappropriate crash barrier





No color road pavement

III Problems and overseas cases



Overseas case

□ The New York City Pedestrian Safety Study & Action Plan, 2010

- New York: By 2030, NY DOT consolidates the speed regulation in order to reduce the traffic fatalities by half goal
- 2009 year in NY city is the safest year ever / Traffic fatality and pedestrian fatality decreased to 35% and 52%, respectively compared to the year in 2001
- 36% of accidents caused by driver negligence leads to pedestrian's death or serious injury
- \Rightarrow 27% of the accidents is the pedestrian deaths or injuries due to the driver's violation
- * 80% of pedestrian deaths or injuries occurred by a male driver
- Two-thirds of serious pedestrian accidents occurred in the main road
- From the main road, about 15% of the accidents happen, but 60% of the fatal accidents are occurred
- 2010-2011year plan
- Installation of pedestrian signal at 1,500 intersections
- Installation of 20mph zone to 60 mile length road in order to improve pedestrian safety

II Problems and overseas cases



Overseas case

Traffic policy for elderly pedestrians

NY Safe Routes to Seniors

- Background
- Transportation Alternative(TA) started 'Safe Routes for Seniors Campaign' for elderly pedestrians
- In 2008, TA started the <u>Safe Routes to Seniors project</u> with <u>NYC Department for</u> <u>the Aging</u> (focuses on the elderly pedestrian safety)
- Check lists
- not enough time to cross the streets
- broken or missing pedestrian ramps
- faded and hard-to-see markings
- turning vehicles failing to yield
- poor drainage or ponding in crosswalks

III Problems and overseas cases



Overseas case

Traffic policy for elderly pedestrians

The selection of pilot areas using GIS spatial analysis)

Senior Areas:

Queens

- Flushing*
- Jackson Heights
- Jamaica Hills
- Rego Park
- Sunnyside



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*Pilot Area

III Problems and overseas cases



Overseas case

Traffic policy for elderly pedestrians

Measures

- Installing new or upgraded pavement markings
- High-visibility crosswalks
- Advance stop bars to encourage drivers to stop before a crosswalk rather than in it
- Narrow streets by reducing the number of vehicle lanes
- Various road facilities maintenance activities
 - 1. replacing missing roadway signs
 - 2. repairing broken curb ramps
- Leading Pedestrian Intervals(LPI), which activate a walk signal before vehicles

get a green light. So pedestrians can have a head start into a crosswalk

II Problems and overseas cases





Traffic policy for elderly pedestrians

• Safe streets for seniors

The areas for elderly pedestrian safety improvement



III Problems and overseas cases



Overseas case

Traffic policy for elderly pedestrians

Conclusion

- Install transport facilities and educate about transport safety to secure the
 - elderly pedestrian safety

Safe driving for pedestrian accident prevention



Improvement method for transportation vulnerable

Design for pedestrian safety

Secure pedestrian passage





Traffic Calming





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Improvement method for transportation vulnerable

Design for pedestrian safety

Smart Crosswalk

- * LED bulbs installed in the vehicle stop line to increase the visibility
- LED bulbs was obtained approval from California Traffic Control Devices Committee(CTCDC) in 1999 and firstly installed at the intersection in California
- This can be helpful to reduce vehicle vs. pedestrian accident





Red light running

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Improvement method for transportation vulnerable

Design for pedestrian safety

- Reduce the turn angle
- Driver reduces vehicle speed to turn right / pedestrian safety can be ensured
- Crossing distance is shorter and a sight distance between vehicle and pedestrian is improved



Improvement method for transportation vulnerable

Design for pedestrian safety

Marking at local street





Cross mark and flash light

Pedestrian-friendly design





Pedestrian-friendly design

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Improvement method for transportation vulnerable

Design for pedestrian safety

Improve school zone



<Improve pavement marking>



<Color pavement at school zone>



<Crash barrier at school zone>



<Word legends on the pavement>

Daejeon

Improvement method for transportation vulnerable

Design for pedestrian safety



Improvement of Walking Environments for the Transportation Vulnerable

Daejeon

Improvement method for transportation vulnerable

Design for pedestrian safety



<Pedestrianfriendly sign>



<Conspicuous sign >



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<Ensure nighttime visibility>



<Insert the word about fine>



<Install driver feedback sign>

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Improvement method for transportation vulnerable

Design for pedestrian safety

- Install lighting facility around crosswalk
- Install in-pavement flashing markers at accident-prone area, especially at night
- Install a red blinker ahead of the crosswalk / driver could easily recognize pedestrian crossing
- Remove obstacles at crosswalk
- Obstacles such as distribution boxes, streetlights, or trees around crosswalk could cause traffic accident because of obstructing of field of vision
- Install refuge island
- Refuge island with minimum dimension of 1.2-1.8m wide and 2.4-3.6m long
- Pedestrian accident reduced from 19% to 60% after installing the refuge island in NY city



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Improvement method for transportation vulnerable

Design for pedestrian safety

Create database

 Create elderly accident database to manage the frequent accident area



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2001~2006 Accident frequency of vehicle vs. pedestrian in Manhattan

V Conclusions



Conclusions

- Importance of Pedestrian-oriented transportation policies
- Create a barrier-free environment by improving the pedestrian environments for children and elderly pedestrian

Recommendations

- Sustainable study has to be performed to make barrier-free environment for transportation vulnerable
- Apply Various pedestrian-friendly design through traffic calming techniques
- Have long-term plan for pedestrian safety such as <u>Safe Routes to Seniors project</u>
- Make database about frequent accident area to improve pedestrian environment

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Thank You !