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Transitioning to safer streets through an integrated and inclusive design

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ABSTRACT

The demand for enhanced traffic safety has been growing with rapid increases in the elderly populations of super-aging societies. To cope with the increasing rates of traffic fatalities and injuries among the elderly, co-creative thinking and community-rooted approaches are becoming more important in shaping policy and actions for safer and sustainable transportation and traffic. To enhance safety, road space has to be designed as a social space with improved social usability to meet diversifying needs in the future. After discussing multifaceted aspects of an integrated design, this paper aims to identify a possible direction of transitioning to safer streets through an integrated and inclusive design that covers road design, built-environment and land use design, and community design. While detailing the rapidly increasing fatalities among elderly pedestrians crossing roads, this paper provides a set of logical ideas and arguments for changing the way we address traffic safety and proposes a governance framework for transitioning to safer streets with a focus on the habitus of unconscious separation and externalization of risk that spoils the compactness of road spaces and the appropriate priorities among traffic participants, thereby inhibiting the safety and autonomy of traffic participants on streets.

Contents

1. Introduction

Most cities in both developed and developing countries are grappling with issues of traffic safety, a prerequisite to the promotion of a sustainable urban future. However, conventional transport planning and traffic engineering have often overemphasized mobility: the speed at which people and goods can travel from one place to another and the capacity of the corresponding movement. This approach mistook means for objectives and brought unfavorable societal and environmental consequences. More appropriate objectives would be enhancing people's quality of life through safer mobility, improving the accessibility of activity opportunities, and ensuring better social usability to meet the demand of diverse traffic participants in the community.

In Japan, the total number of road traffic fatalities has significantly decreased since peaking at 16,765 people in 1970. During the 1970s,

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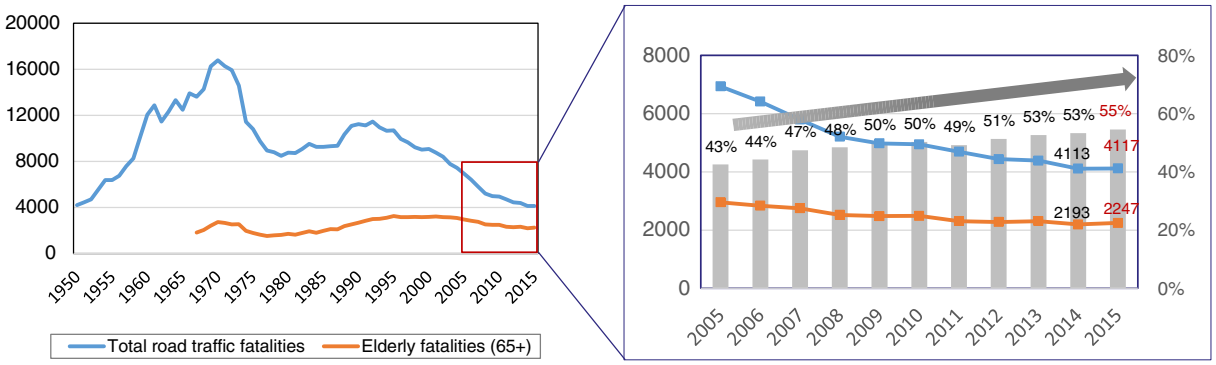

Fig. 1. Recent trends in road traffic fatalities in Japan (source: Ref. [2]).

fatalities dropped by 50% while the number of motor vehicles doubled and the total vehicle travel distance increased 1.7 times (see Fig. 1). The reduction in the 1970s was largely attributable to improvements in the road user environment via devices, infrastructures, and road space design aimed at improving safety rather than improving the road users themselves. During the 1990s and 2000s, the focus shifted to improving the behaviors of road users, especially drivers, in hopes of achieving further reductions in fatalities [1].

Regardless of these efforts, however, the reduction rate of traffic fatalities has been slowing down in the 2010s; moreover, there was even a slight increase in 2015, as shown in Fig. 1. The rapid progression of the super-aging population in Japan is one of the major factors keeping traffic fatalities up. According to the data, elderly fatalities now account for 55% of all traffic fatalities. Looking at the fatalities by road user type in Fig. 2, elderly killed while walking represent 49% of the total, with 76% killed crossing the road and 71% of those deaths attributable to at-risk crossings away from pedestrian crosswalks.

Given these facts and a marked change in social conditions, society needs a more holistic approach that enables transitioning to safer streets in addition to conventional approaches like traffic engineering, vehicle engineering, psychology, education, and medical science.

This paper aims to identify possible methods of transitioning to safer streets through an integrated and inclusive design that covers road design, built-environment and land use design, and community design. We first address the relationship between urban structures, vehicle travel speeds, and traffic fatalities from a nationwide macroscopic viewpoint and then underline the importance of taking an integrated approach for the promotion of traffic safety.

2. Urban structural factors affecting traffic safety

2.1. Urban form, travel speed, and traffic fatality

Observers have often shown that a rapid increase in traffic fatalities over the course of the motorization process is associated with the development of design-deficient road infrastructure and higher-speed vehicles. One of the most problematic aspects of motorization is the standardization of travel speed. Whether in towns, suburbs, or between cities, most vehicle drivers pursue speed—and the desire to travel long distances at high speeds is ever-present, regardless of whether the driver is inside or outside an urban area. The pursuit of speed irrespective of place results in uniform expansion that impairs the hierarchy of urban spaces. Even after the development of efficient road networks, safety problems rooted in people's desire for speed persist.

Based on a causality analysis of urbanization, motorization, and the environment by Hayashi et al. [3], Fig. 3 illustrates the causality among urban form, travel speed, and quality of mobility in terms of efficiency, safety, and the environment. Urban form, characterized by the hierarchical structure of urban spaces and transportation networks, has a determining influence on the quality of mobility—especially traffic safety through a sense of travel speed.

Until recently, vehicle travel speeds have been a low-priority area in urban road design in Japan and Asian countries. This problem seems to be associated with the loose controls of urban structures lacking the hierarchy of urban spaces.

Fig. 4 shows the influence of urban structural factors on traffic safety. These three figures illustrate the relationship between urban population density, vehicle travel speeds, and rates of road traffic fatalities between 2008 and 2010 for 65 metropolitan and regional-core cities in Japan

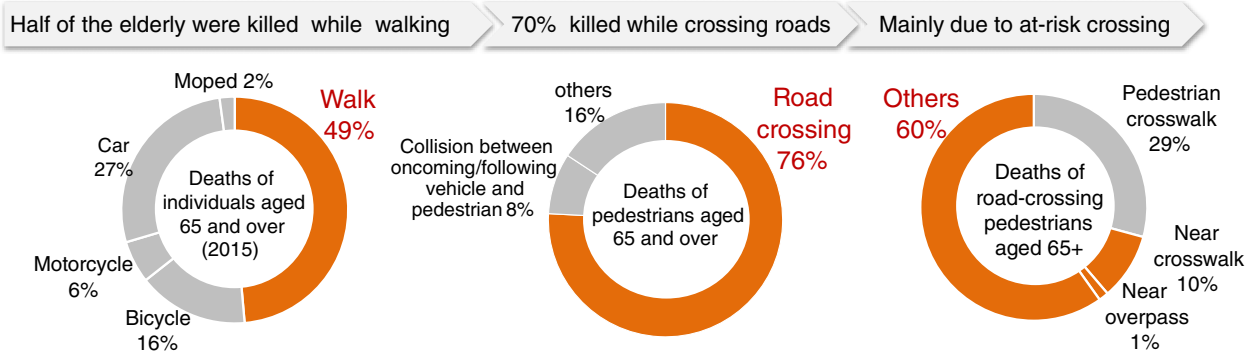

Fig. 2. Characteristics of road traffic fatalities among the elderly population (source: Ref. [2]).