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Journal of Transport & Health

journal homepage: www.elsevier.com/locate/jth

Skate and die? The safety performance of skateboard travel: A look at injury data, fatality data, and rider behavior[☆]

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ARTICLE INFO

Keywords:

Skateboarding
 Skateboard travel
 Non-motorized travel
 Active travel
 Injuries and fatalities
 Operational characteristics

ABSTRACT

Background/methods: While usually thought of for recreation, skateboards can and are used for travel. Recreational skateboarding, an “extreme sport”, can carry a reputation for danger. What is the safety performance of skateboard travel? This study explores skateboard travel safety by (1) examining fatality and injury data, and (2) observing how skateboarders ride and how that could influence safety. Data on skateboarder injuries and fatalities are available for the United States from two national databases, news reports, and a skateboarding interest group. Observations of skateboard travelers and their travel behavior took place at the University of California, Davis, which has more than 1000 skateboard travelers. Observations include travel speed, conflicts with other users, and instances of potentially dangerous behavior.

Results: In California in 2012, 14 skateboarders or scooter riders were killed in collisions with automobiles; at least 10 of which occurred during travel. Utilizing mode share and trip length data from the California Household Survey, we estimate this corresponds to a fatality rate of approximately 20.9–23.0 deaths per 100 million miles traveled. Observed skateboarders travel between 6 and 14 miles per hour and 9.7 mph on average. This is very similar to bicyclists that were observed (6–19 mph range, 11.6 mph average). Additionally, observations show that skateboard travelers travel forward in straight lines and do not typically engage in aerial tricks or other unpredictable behavior.

Conclusions: Skateboard travelers, like pedestrians and bicyclists, are “vulnerable users” of the transportation system, with fatality rates per distance traveled several times greater than motor vehicle occupants, and with motor vehicle collisions a common factor. Behaviorally, skateboarders roll along at speeds slightly slower than bicyclists. Thus, skateboarding safety issues mirror bicycle safety issues, with some potential for skateboarder-pedestrian conflicts due to speed differentials, and skateboarder injury and fatality risk from exposure to motor vehicles.

1. Introduction

A “hazardous condition”, an “immediate threat”, and an “imminent risk” to riders and by-standers are some of the terms that can be found in regulations to describe skateboarding (Fang, 2013). Despite this reputation for danger, individuals engage in skateboarding, not just as a form of recreation, but also as a means of transportation. The California Household Travel Survey (CHTS) shows that 0.14 percent of trips in the state are taken using skateboards or similar modes such as roller/in-line skates and push scooters (California Department of Transportation, 2013). Taking into account the population of California, the number of trips

[☆] This is an invited manuscript based on work presented at ICTH 2016-USA.

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<http://dx.doi.org/10.1016/j.jth.2017.08.010>

Received 1 October 2016; Received in revised form 10 August 2017; Accepted 17 August 2017
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people make, and the CHTS reported average trip distance for skateboarders and similar modes of 0.7 miles, this extrapolates to approximately 48 million miles traveled per year. Two-hour, afternoon peak observations in Portland, Oregon found skateboard travelers passing through 79 percent of intersections studied (Portland OR Bureau of Transportation 2015). Skateboard travel has also found a niche at some college campuses, with mode shares as high as seven percent and mode share growth in recent years (University of California, Davis Institute of Transportation Studies 2015; San Jose State University Transportation Solutions 2015; University of California, Santa Barbara Office of Budget and Planning 2014; Carr, et al., 2013; University of Oregon Campus Planning and Real Estate 2013; KTU + A, 2009; University of California, Berkeley Physical and Environmental Planning 2009). There is also demonstrated use of skateboards for the first-mile/last-mile portion of multimodal trips. In Los Angeles, California an estimated two percent of transit riders skateboard to reach transit stops each day, which extrapolates to more than 30,000 trips (Los Angeles Metropolitan Transportation Agency 2015).

While individuals choose to skateboard for travel, it is not always a legal travel mode. Skateboarding is often prohibited in large sections of cities, including roads, sidewalks, districts, and areas of certain land use types (Fang, 2013). While such regulations usually are not explicitly targeted at skateboard travel, they nonetheless can limit travel, making trips to some destinations illegal. A common motivation for skateboarding prohibitions are the aforementioned safety concerns. Such concerns have also been used as an argument against making regulations on skateboard travel more permissive. For example, a newspaper editorial called a proposal to formally allow skateboard travel in Portland, Oregon as a “plan for new and better road kill” that would “boost the supply of young organ donors” (Thomas, 2008).

While negative perceptions of safety may not be surprising given the reputation of recreational skateboarding as an “extreme sport” or “action sport”, is it in actuality an exceedingly dangerous mode of travel? This paper explores this question in two ways. First, we examined available fatality and injury data for information on incidents involving skateboarders. In particular, we looked for whether we could ascertain whether incidents occurred during skateboard travel rather than recreational skateboarding. Second, we observed the “operational characteristics” of skateboarders, or how skateboarders ride when they are traveling and how that might impact safety. How fast do skateboarders ride and what is the resulting speed differential with other users? Additionally, are skateboard travelers simply rolling along like other travelers, or do they engage in any overtly unsafe or unpredictable behaviors that result in conflicts with other users?

Skateboard travel is a relatively unexplored topic in transportation research. The Federal Highway Administration (2004) included skateboards among emerging road and trail users whose presence raises operational and safety questions that call for further research. O'Brien et al., (2009) reviewed the literature on youth and sustainable transportation and identified skateboarding as particularly needing further research. Literature in the health and medical field have looked at skateboarding safety, but have typically focused on recreational skateboarding (Orenstein, 1996; Kyle, et al. 2002; United States Consumer Product Safety Commission 2003; Hunter, 2012). Some literature does mention that injuries can occur during skateboard travel (Shuman and Myers 2015; Keays and Dumas, 2014); however transportation-related injuries are not a primary focus. Rodier et al. (2003) reviewed literature on several low speed travel modes: walking, bicycling, in-line skating, scooters, wheelchairs, and skateboarding and found speed data available for all the modes they studied except skateboarding. FHWA (2004) measured the speeds of users of many low-speed modes, but out of 596 speed observations, only 10 were of skateboarders. A study of mode choice decisions found that active skateboard commuters and those that consider skateboarding but do not, both have positive perceptions of the convenience and enjoyment of skateboard travel (Fang and Handy, 2017). However, they differ significantly in perceptions of safety. Thus, safety appears to be a key threshold in the decision to skateboard for travel or not.

2. Methodology

This study examines the safety performance of skateboard travel by (1) examining available data on skateboarding-related fatalities and injuries, and (2) observing skateboarder operational characteristics that could have an impact on safety including travel speed and rider behavior. Fatality and injury data come from two United States federal government sources, one interest group, and news media reports. Skateboarder speed and riding behavior data comes from original observations of passing skateboard commuters at the University of California, Davis.

2.1. Skateboards: the device

For the purposes of this study, a skateboard refers to a device that includes a “deck” or platform for a rider to stand on, which rolls on small wheels attached to the deck with “trucks”, the axle component. Skateboards have come in many designs over the several-decade history of skateboarding (Brooke, 1999). Types of skateboards seen in contemporary skateboarding include the “trick skateboard”, common in recreational skateboarding where the goal is to perform “tricks” – vertical or aerial maneuvers off the ground or objects. This is the type of skateboard conducive for use on the obstacles and equipment seen at skate parks or seen in televised skateboarding competitions. Looking at the inventory available for sale by skateboarding retailers, trick skateboards generally range between 28 and 32 in. long, between 7.5 and 8.25 in. wide, and with wheels between 50 and 60 mm (1.97–2.4 in.) in diameter. Decks of trick skateboards have a rounded rectangular shape which also lead to an alternative name of “popsicle boards”. The nose and tail of trick skateboard decks are also angled up. These “kicktails” on trick skateboards act as levers to manipulate the skateboard vertically.

Another common type of skateboard is the “longboard”. Recreationally, longboards can be used in the activity of longboarding, where the goal is cruising and speed over distances rather than vertical tricks. Recreational longboarding thus typically occurs over

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