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Addressing wrong-way driving as a matter of policy: The Florida Experience

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ABSTRACT

Wrong-way driving (WWD) incidents garner considerable interest from the media, elected representatives, and policy makers. Almost a half-century after Hulbert and Beers (1966), the National Transportation Safety Board and others continue to research WWD countermeasures. The recent increase in WWD re-kindled a national discussion in the United States of America, and is bringing about a significant change in the approach to addressing this crash type. The main purpose of this work is to present a policy-oriented framework toward addressing WWDs in a systematic manner and to suggest a systemic discipline for transforming policy objectives to actionable outcomes. To accomplish this goal, the leadership of the Florida Department of Transportation played a pivotal role in converting strategy to reality by promoting organizational linkages and active collaboration. The method included: (a) implementing pilot projects; (b) conducting a statewide study with crash evaluation and field reviews, identifying interchange types, and developing countermeasures; (c) evaluating and deploying experimental devices specifically approved by the Federal Highway Administration; (d) conceptualizing a human factors study; (e) transforming recommendations to design guidance; (f) discussing with planners on interchange types susceptible to WWDs; (g) retrofitting exit ramps with the recommended countermeasures; and (h) leveraging the media to promote awareness and to educate the public about the dangers of driving under the influence. The result of this policy push is that, from an engineering view point, design changes were made; from an education perspective, WWD awareness was prioritized; and from an enforcement angle, the Florida Highway Patrol proactively detects and addresses WWD crashes.

1. Introduction

The Special Investigation Report of the National Transportation Safety Board (NTSB, 2012) noted that, during 2004–2009, annually 357 wrong-way driving (WWD) fatalities occurred and constituted about 2.8% of all fatal crashes on divided highways in the United States of America. With states defining alcohol-impairment at a blood alcohol concentration (BAC) at or above 0.08%, it was alarming to note that 69% of the wrong-way drivers were impaired. The NTSB Report helps infer that the odds of a 70-plus year-old being involved in a WWD crash are greater than the odds of being involved in a non-WWD crash. WWD is not a novel phenomenon, for it was discussed a half-century ago by Hulbert and Beers (1966) and Tamburri (1969); the former studied the impact of signing and pavement markings (S&PM) countermeasures, while the latter interviewed wrong-way drivers and evaluated the effectiveness of countermeasures installed on California freeways and expressways. International discussion (Brevoord, 1984; De Niet and Blokpoel, 2000; Sagberg, 2003; Scaramuzza and Cavegn, 2007; Xing, 2015) provides useful hints on the breakdown of WWD incidence with respect to actual wrong-way entries from the exit ramps and actual turn movements on freeways; by proxy, the 'unintentional' versus 'deliberate' maneuvers provide an interesting avenue for researching the causes and remedies of WWD. Several other works (Gabriel, 1974; Shepard, 1976; Vaswani, 1977; Copelan, 1989) to the more recent studies (Zhou et al., 2014) explored the use of crash data and traditional traffic control devices to counter WWD incidence. Interestingly, the potential use of technology to address WWDs was explored 45 years ago (Friebele et al., 1971; Forthoffer et al., 1996).

These works were mostly studied more than a decade ago, and have mainly addressed specific technical aspects. That said, some of the ground-breaking works from Europe provided a holistic perspective for addressing road traffic crashes from a policy angle. Examples include the 'Vision Zero' initiative introduced by the Swedish Parliament in 1997 with an aim toward zero fatalities (Whitelegg and Haq, 2006) with a discussion on its applications (Tingvall and Haworth, 1999), and a systems management approach (Larsson et al., 2010) including the need for cultural change (Johnston, 2010). Other important works also studied the impact

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of 'Vision Zero' (Elvik, 1999; Elvik and Amundsen, 2000). The Netherlands also has had a history of developing programs that are policy-oriented, thereby helping drive down the fatalities through a thought-driven process (Wegman et al., 2005; Wegman et al., 2008) and its evaluation after a decade of implementation (Weijermars and Wegman, 2011). These works help recognize the need to not only juxtapose policy and practice, but also to convert the countermeasures deployment into a comprehensive strategy.

As the lead task manager of the statewide WWD effort, the author's main goal was to support the leadership by synthesizing Florida's WWD initiatives into a pragmatic policy framework for quick implementation. This work is data-driven and synthesizes discrete elements into cohesive units. The methodology presented here can be replicated not only for WWD mitigation but also for other crash types. This work also intends to illustrate that when initiatives receive thrust from senior leadership and are supported by the technical professionals, they can result in an alignment of forces to improve road safety.

2. Methodology

This work began as an attempt to develop WWD countermeasures. At the outset, and with input from the state highway safety program, the Department's management team suggested that the State Traffic Engineering and Operations Office (STEO) evaluate the WWD concern. Added to this were the requests from the news media regarding the increasing WWD incidents. STEO then evaluated the ongoing initiatives from across the nation, and started a conversation with the eight District Traffic Operations Offices in the state which includes the Florida's Turnpike Enterprise (FTE). STEO decided to work closely with FTE and District 3 offices. The former was requested to help with a pilot deployment mainly due to its geographic spread, and the expedited ability to procure and deploy such initiatives. The District 3 region was selected mainly due to a recent incident involving a school teacher and one that garnered extensive media attention, and also because the location is in close proximity to the state headquarters.

STEO soon commenced a statewide study with the primary objectives of a comprehensive assessment of a WWD crash history during a 5-year period, inventory and field reviews at select locations, and recommendation of countermeasures. A few months into the study, and while the FTE and District 3 pilot projects were in vogue, the Tampa Bay area began experiencing several WWD incidents. This lead to a Districtwide effort in the District 7 region.

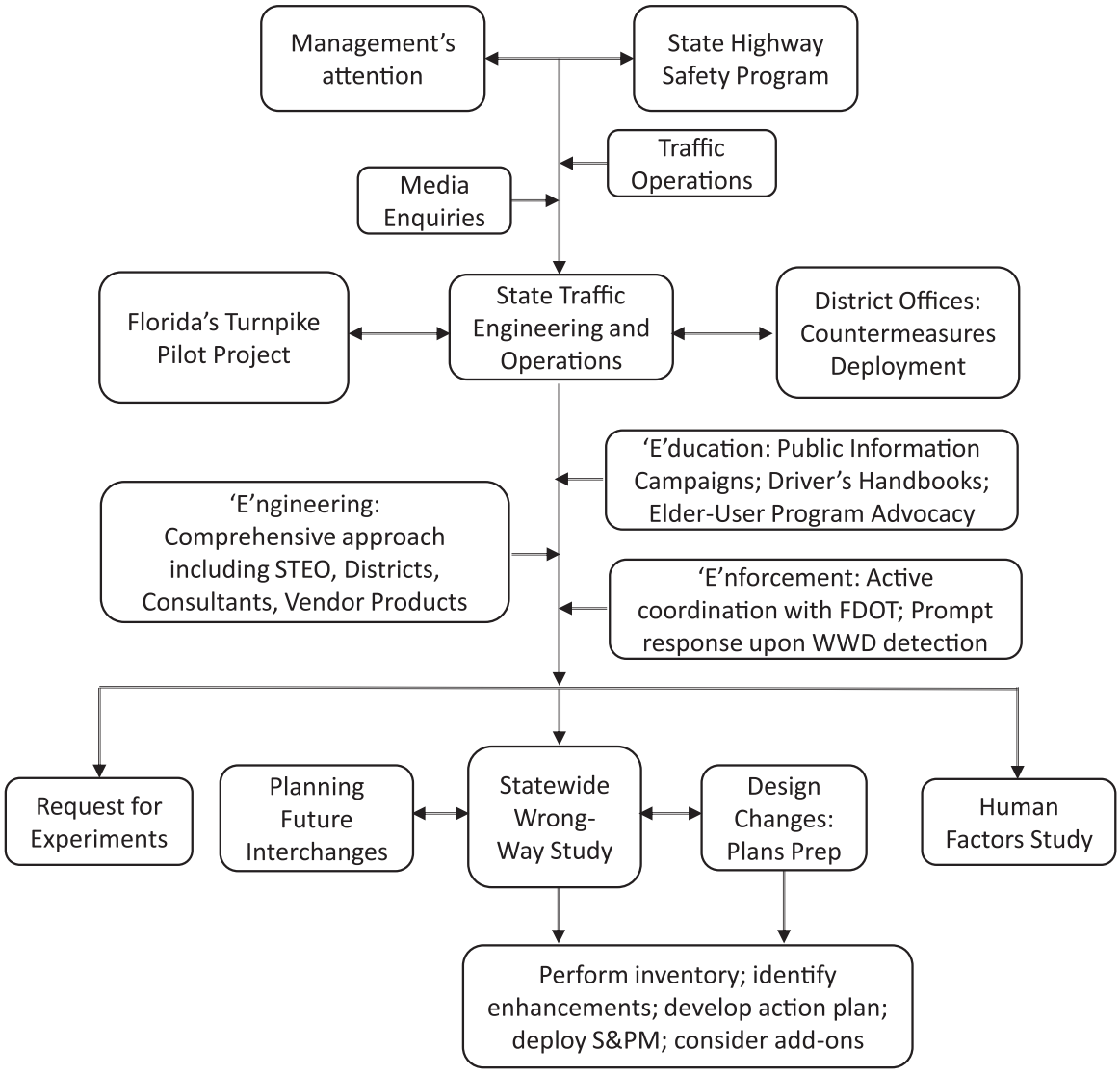

Fig. 1. Proposed Framework.