The Netherlands
Research School for
Transport, Infrastructure
and Logistics
TRAIL

11th TRAIL Congress
November 2010

IMPROVING INTERSECTION SAFETY

Summary of the research plan

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KEYWORDS

Road safety, intersection, infrastructure, driving behaviour

ABSTRACT

The Sustainable Safety vision aims to prevent crashes and in case that is not possible to reduce the severity of crashes. In this proactive approach, human capacities and limitations are taken into account as the guiding factors, based on the principle that 'man is the measure of all things'. In order to achieve safe road traffic, these human characteristics form the starting point, together with an integral approach of three components namely man, vehicle and road. Wegman & Aarts (2005) explain this further by describing that the 'road user is well informed and trained, and is controlled wherever necessary in the correct performance of the traffic task'. The vehicle is supposed to protect the occupant in case of a crash as well as support 'the performance of traffic tasks'. In the same way, the design of the infrastructure is supposed to meet the human capacities and limitations (see also Wegman, Aarts & Bax, 2008). Since the launch in 1997, the Sustainable Safety vision appears successful as the number of fatalities and in-patients decreased in the period 1998 to 2007 as a result of measures taken that are in line with the vision. In this connection, Weijermars & van Schagen (2009) also gave another explanation namely that the vision was supported by a lot of parties such as provinces, municipalities, police and the Ministry of Transport. However, there is still a lack of knowledge about what a sustainably safe road infrastructure is and how a sustainably safe road infrastructure exactly looks like (Wegman & Aarts, 2005).

There is a need for sufficient comprehensive research results to resolve safety issues on the intersections on 80 km/u distributor roads (Wegman & Aarts, 2005). Road safety on these roads is a problem as the 80 km/h roads are a relatively unsafe road category as is pointed out by Duivenvoorden (to be expected). Relatively the majority of all fatal crashes in the Netherlands occur on 80 km/h roads, which is also the case for the year 2008. In 2008, 225 of

all fatal crashes in the Netherlands (630) occurred on these roads, resulting in 239 fatalities, which is 35% of all fatalities (677). From these 225 fatal crashes, 30% (67) occurred at intersections and 70% (158) on road sections. When studying the intersections of these rural distributor roads, mainly cars are involved in fatal crashes occurring at intersections the period 2006-2008: in 156 (73%) of the 214 fatal crashes, a car was involved, with various crash opponents (e.g. a bicyclist or a truck). In 65 (30%) out of the 214 fatal crashes, a bicyclist was involved with various crash opponents such as a car, a truck and a delivery van. However, the most frequent crash opponent of the bicyclist is the car. In 35 crashes, the crash was between a car and a bicyclist. Side impact crashes are the most frequent occurring crash type at intersections: 148 out of the 214 fatal crashes was a side impact. The second most frequent occurring crash type is a frontal crash (30 crashes). Furthermore, the results showed that the majority of the fatal crashes at intersections occurred during the day (165 out of 214), as the number of fatal crashes increases from the morning till 6 pm and declines after 6 pm. For injury crashes, two peaks in the number of crashes are visible: the peak period in the morning and in the afternoon (Duivenvoorden, to be expected).

Intersections are awaiting a solution in order to improve intersection safety. With respect to intersection safety, roundabouts already have quite a good design. Roundabouts are designed in such a way that drivers are forced to cross the roundabout with relatively low driving speeds and also the number of potential conflict points is relatively low (CROW, 2002; SWOV, 2010). A potential conflict point is a point at an intersection where it is possible for road users to come into conflict with each other. This is however not the case for priority and signalised intersections. Driving speeds can be high especially when no speed reducing measures are applied. On these intersections driving speeds can be higher than the speed required from a safety point of view. The driving speeds at intersections need to be lowered in order to increase the level of safety. The question is how to achieve these safe speeds (Wegman & Aarts, 2005).

Within this PhD research, special focus is on the interaction between the physical characteristics of the infrastructure and road safety and how this is influenced by driving behaviour of the road users. With respect to driving behaviour, driving speeds will be studied as well as other driving behaviour characteristics if they appear to be relevant based on various studies within this PhD research. Regarding the already performed studies on road safety, Duivenvoorden (2008) points out that road safety is usually not studied in conjunction with both infrastructural characteristics and driving behaviour. On the one hand, research is focussing on the relationship between infrastructure and road safety, see for example the studies of Caliendo, Guida & Parisi (2007), Noland & Oh (2004) or Reurings & Janssen (2007). On the other hand, studies are focussing on the behavioural aspect related to road safety, see for example the studies of Rothengatter & Huguenin (2004), van der Horst & de Ridder (2007), van Driel, Davidse & van Maarseveen (2004) or Janssen, de Ridder & Brouwer (2004). Therefore, in this research the infrastructural characteristics as well as the behavioural aspects will be studied in relation to road safety.

This abstract is a summary of the Research plan 2010-2012 (Duivenvoorden, to be expected-2).

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