

An interview study among road authorities¹

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Abstract

An interview study was conducted among provincial road authorities. In the interviews, road safety issues and design dilemmas of intersections at 80 km/h rural roads were addressed. The results showed that problems regarding safety occurred between cyclists and motorised traffic. Although road authorities indicate that road safety is an important factor when designing solutions, speed-reducing measures are not applied.

Keywords

Road safety, intersections, 80 km/h rural roads, interview study, road authorities

1 Introduction

Regional road authorities do not always design roads according to the guidelines and manuals. It appears that the situation is deviant and does not allow to follow the guidelines (Boer, Grimmius & Schoenmakers, 2008; Weijermars & Aarts, 2010). A second reason is that the organisation of the road authority does not agree with certain guidelines and third, following the guidelines is believed to not lead to the safest situation.

Several studies examined the actual situation in the real world and how safety is taken into account by interviewing road authorities. One example is an online questionnaire study that aimed to gain insight into how sustainably safe the Dutch road network is Doumen & Weijermars, 2009. Partly, the questionnaire focussed on what intersection control types are present on the Dutch road network. Although the response was low as three out of twelve provincial road authorities completed the questionnaire, results on numbers of various intersection types at crossings between different road categories were presented. Doumen & Weijermars concluded that not many speed-reducing measures are applied at intersections in rural area. Whereas Doumen & Weijermars were more focussed on collecting numbers than on underlying reasons why certain intersection control types were constructed, Bax & Jagtman (2008) were interested in these reasons. By interviewing all twelve Dutch provincial road authorities, Bax & Jagtman found several reasons for not applying raised intersections (plateaus) in less than half of the provinces. Given reasons were lack of space, maintenance or objection by citizens. However, the most frequently mentioned reason why road authorities did apply measures to improve road safety was road safety.

The previous mentioned studies did not focus on intersections on 80 km/h rural roads. Therefore, the present study aimed to gain insight in the safety problems and design dilemmas regarding the road infrastructure of intersections on 80 km/h rural roads, factors affecting intersection design and the solutions chosen.

2 Method

2.1 Participants

Five provincial road authorities participated in the interview study. Four of these provinces (Gelderland, Noord-Brabant, Overijssel and Noord-Holland) appeared to have a considerable amount of casualties and road length of 80 km/h rural roads. The fifth road authority (the province of Zuid-Holland) was questioned as the province was known for applying speed-reducing measures at rural intersections whereas this was not done by other provinces.

2.2 Interview

The interview consisted of two parts. The first part handled general topics such as general road safety problems, design dilemmas, policy regarding intersections and factors that affected intersection design. The second part addressed a detailed discussion of intersections based on photos of these intersections. Per interviewee, eight intersections were selected in advance. Specific problems and dilemmas as well as design considerations for each intersection selected were discussed.

2.3 Procedure

In the first part of the interview, a question addressed various factors which were expected to affect the design of intersections. These factors were written down on cards including several blank cards for new factors. The interviewees were asked to choose factors that were affecting intersection design and to add new factors on blank cards if applicable. Next, the interviewees were given the task to rank the chosen factors into three categories from having a small, medium or large effect on intersection design. These categories were outlined on a A3 formatted scheme. Factors which were not applicable were not placed on the scheme. During the second part of the interview, the interviewee was asked to perform the task again of selecting and ranking factors for each intersection discussed.

During the interviews eight intersections per province intersections were discussed: signalised and priority (give-way) intersections with three and four arms. The selection of intersections to be discussed was made based on policy documents containing a list of intersections that recently had been reconstructed. Based on pictures on Google Street View, the presence or absence of various design elements was examined, namely speed-reducing measures, right turn lane, left turn lane, limited access (e.g. for agricultural traffic), physically separate driving directions near the intersection, bended cycling facility for cyclists crossing the minor road and bicycle crossing in two phases for cyclists crossing the major road.

3 Results

In total, 22 intersections were treated during the interviews. Various problems and dilemmas appeared to be present at intersections. In Table 1, an overview is presented. The most listed problems appeared to be conflicts between turning vehicles and cyclists.

Table 1: Overview of the problems and the solution chosen

<i>Problems</i>	<i>Solutions chosen</i>
Conflicts between turning vehicles and cyclists (n = 8)	Red asphalt on bicycle path while crossing minor road; one not red
Crossing cyclists (n = 4)	Adjusted bicycle crossing while crossing major road
Capacity or changes in traffic flow (n = 4)	Adjusted traffic signal control
Road safety (n = 2)	Applying traffic signals
Illegal overtaking manoeuvres or experienced difficulties while turning (n = 2)	Removal of left or right turn
Absence of perpendicular connection (n = 1)	Perpendicular connection with minor road
Use and design (n = 1)	Adjusted right of way situation

It appeared that ‘road safety’ was the most listed factor that affected intersection design. Other frequently listed factors were ‘implementation costs’ and ‘traffic volume’. The design of the 22 intersections were discussed which resulted in an overview of the design characteristics which were present. In Table 2, a summary is presented. At priority (give-way) intersections, right turn lanes are not applied frequently. Furthermore, it appeared that speed-reducing measures were not applied at all.

Table 2: Overview of design characteristics

	<i>Priority (give-way) intersection</i>		<i>Signalised intersection</i>	
	<i>3 arms (N = 6)</i>	<i>4 arms (N = 8)</i>	<i>3 arms (N = 2)</i>	<i>4 arms (N = 6)</i>
	%	%	%	%
Speed-reducing measures	0.0	0.0	0.0	0.0
Presence of left turn lane	33.3	25.0	100.0	100.0
Limited access	0.0	12.5	50.0	50.0
Separation of driving directions	0.0	12.5	50.0	50.0
Bended cyclist facility	16.7	0.0	0.0	0.0
Bicycle crossing major road (2 phases)	50.0	12.5	50.0	50.0
Presence of right turn lane	16.7	25.0	100.0	83.3

4 Discussion and conclusions

The aim of the interview study was to gain insight in the road safety problems and design dilemmas regarding the design of intersections at 80 km/h rural roads. It can be concluded that road authorities experience problems with cyclists crossing the intersection or with conflicts between turning vehicles and cyclists. Capacity or changes in traffic flow were also listed. In order to solve the problems, various elements of the intersections were reconstructed such as the bicycle facility or the traffic signal control. Road safety, traffic flow, implementation costs and space available appeared to be the most frequently cited factors affecting intersection design.

Although road authorities apply various solutions to the intersections, the detailed analysis of the intersections revealed that speed reducing measures (e.g. plateau) were not applied. This means that driving speeds are not lowered which enables motorised traffic to pass through the intersection with relatively high driving speeds. A possible explanation is that 80 km/h rural roads have a flow function according to road authorities. The flow function does not match with applying speed reducing measures at the intersections. This may indicate a conflict between road safety on the one hand and traffic flow on the other hand. Several studies show that speed reducing measures are not often applied at intersections on 80 km/h rural roads (e.g. Bax & Jagtman, 2008; Doumen & Weijermars, 2009).

From a road safety point of view, speed reduction is desirable. The severity of crashes in terms of damage and injuries is higher when impact speeds are higher (SWOV,

2009). The Sustainable Safety vision adopted the concept of safe speeds based on the safe speed diagram of Tingvall & Haworth (1999). Safe speeds are based on the type of potential conflict and the type of road users involved. For intersections on 80 km/h rural roads, the safe speed would be 50 km/h since side-impacts can occur. In case cyclists are present at the intersection, driving speeds should be reduced to even 30 km/h.

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