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Road and Rail Infrastructure III

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INNOVATIVE APPROACHES OF PROMOTING NON-MOTORIZED TRANSPORT IN CITIES

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Research Center of Transport Planning and Traffic Engineering, Institute of Transportation, Vienna University of Technology, Austria

Abstract

As the number of cyclists on Viennese streets grows, they are increasingly seen as a danger to pedestrians and even car drivers, especially by the media. Statements like "these scofflaws don't obey the rules" or "they run red lights and don't stop at stop signs" are common. Public perception is that also pedestrians tend to re-interpret traffic laws in their sense – they simply cross intersections against red lights when they feel safe about it (physically, not only in terms of getting caught). The most common reaction to this behaviour is the claim for more enforcement and even license plates for bikes. We propose a more innovative approach, which takes into account the reasons for this legally non-conformant behaviour of non-motorized traffic: bikers and pedestrians should be allowed to run red lights when not obstructing or endangering themselves or others. Under the same circumstances, cyclists should be allowed to treat stop signs as yield signs. But why?
"The purpose of all the traffic lights, signs, and lines – is to prevent cars from running into everything else" [1]. Current laws are ensuring the ease and flow of motorized traffic often at the expense of the ease, flow and even safety of non-motorized traffic. Motorists must obey these laws due to the fact that they are impaired in their visual and acoustic perceptions by the drivers' perspective. Cyclists and pedestrians on the other hand can run red lights and stop signs without safety concerns – they have a better, unobstructed view on cross sections, they can accelerate and brake within fractions of a second, they can hear even quiet safety hazards, have little inertia and a low potential for damage. In this paper we analyse which built and legal structures would be necessary to make a city work without car-oriented regulations and what it would look like.

Keywords: red lights, jaywalking, scofflaw, self responsibility

1 Introduction

As the number of cyclists on Viennese streets grows, they are increasingly seen as a danger to pedestrians and even car drivers, especially by the media. Statements like "these scofflaws don't obey the rules" or "they run red lights and don't stop at stop signs" are common. Public perception is also that pedestrians tend to interpret traffic laws rather broadly – they simply cross intersections against red lights when they feel safe about it (physically, not only in terms of getting caught). The most common reaction to this behaviour is the claim for more surveillance [2] and even license plates for bikes [3].
We propose a more innovative approach, which takes into account the reasons for this legally non-conformant behaviour of non-motorized road users: bikers and pedestrians should be allowed to run red lights when not obstructing or endangering themselves or others. Under the same circumstances, cyclists should be allowed to treat stop signs as yield signs.

In the second section we analyze Viennese traffic accident statistics, focusing on accidents at signalled and non-signalled intersections. In section 3 we look at the question why regulations are disregarded in the first place, and why there is a difference between car drivers and active modes (pedestrians and cyclists). In section 4 we propose new Road Traffic Regulations which better respect the needs and abilities of different transport modes. Section 5 gives international examples where parts of our claims are already successfully implemented. In section 6 we sum up our experiences in proposing these new regulations and draw conclusions in section 7.

2 Analysis of red walkers and accidents at Viennese intersections

The Viennese modal split is currently (2011) 28.3% walking, 5.6% cycling, 37.2% public transport and 28.9% motorized individual transport, with the goal of 27% (sic!) walking, 8% cycling, 40% PT and 25% motorized individual transport until 2020 [4]. The Viennese cycling network is about 1,250 kilometres, consisting mostly of bike routes (55%, only indicated with signs), marked cycle lanes (24%, painted on the road) and separated cycle paths (21%) [5].

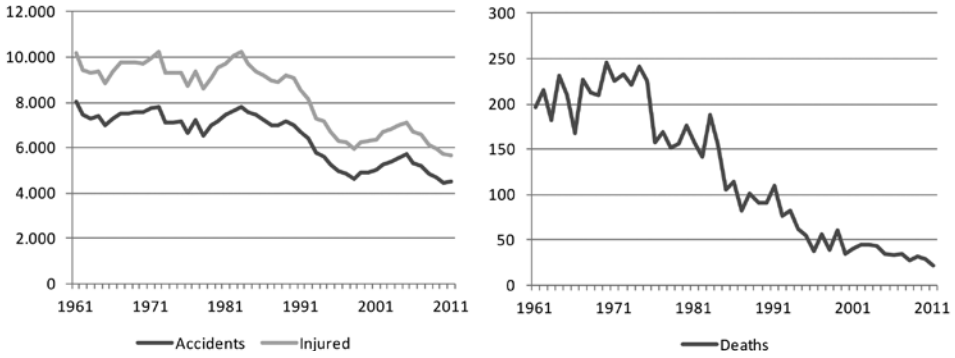

Figure 1 Time line of number of traffic accidents, injured (left) and deaths (right) in Vienna [6]

The number of traffic deaths in Vienna has drastically decreased in the last 50 years and only stagnated in the last decade at about 20 to 30 per year. The number of accidents and the number of injured are closely correlated and have not decreased that much (see Figure 1). When looking at the distribution of means of transport for casualties, severely injured and deaths, it becomes clear that pedestrians and cyclists as most vulnerable road users contribute to traffic deaths above average (see Figure 2). For 2020 the Viennese government has issued the goal of Vision Zero – zero fatalities in traffic in 2020 [7].

As pedestrians are overrepresented in the number of deaths compared to their modal split and also their number of accidents, special efforts are undertaken to increase pedestrians' safety. Red walking is regarded as risk factor and has been surveyed by the Austrian road safety association Kuratorium für Verkehrssicherheit (KfV) in 2002 [8].

9 Viennese intersections were observed and red walkers were questioned about the motivation for their actions. The study found that at these intersections on average 81.1% obeyed the traffic lights and walked on green. Of those crossing the intersections on red, about 18% were red runners, trying to catch a tramway or a bus, thus probably not exerting special attention to traffic. 82% however walked against the red light deliberately. Of all red crossers over 50% crossed shortly after the light changed to red (late starters) or shortly before the light changed to green (early starters) thus using the safety reserves of the traffic light signalization.

The KfV authors have tried to get further insight into the red walking topic by analyzing the Viennese accident data 1992 to 1998. They found that around 80% of pedestrian accidents at signalled intersections were caused by cars, another 9% by lorries. Unsurprisingly only

3% of pedestrians were not injured while more than a quarter were severely injured and over 2% died. The analysis of accident causes showed that vehicle drivers were to blame in more than half of the pedestrian accidents at signalled intersections with crosswalks. And vehicle drivers are also accountable for nearly all pedestrian accidents at unsignalled crosswalks as pedestrians have the right of way there.
To conclude, even when pedestrians obey red lights and keep to marked crosswalks they cannot rely on not being harmed. The traffic light drill exerts a sense of "pseudo-safety".

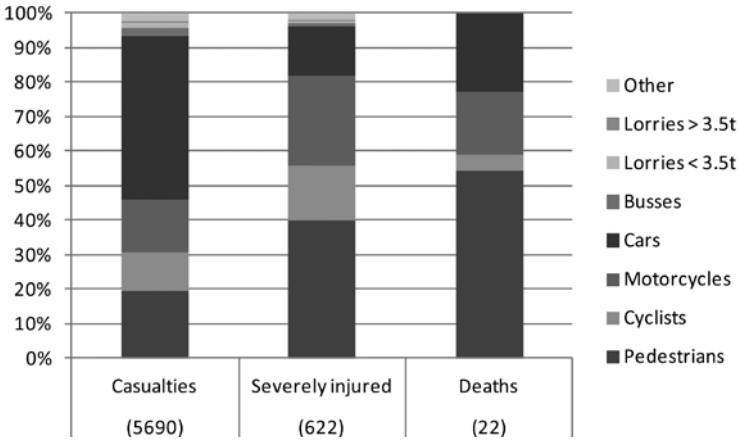

Figure 2 Distribution of means of transport for casualties, severely injured and deaths from traffic accidents in Vienna 2011 (total number in brackets) [6]

3 Understanding rule-breaking behaviour and differences between means of transport

3.1 Why do pedestrians and cyclists often disobey the rules that should protect them?

"The purpose of all the traffic lights, signs, and lines – is to prevent cars from running into everything else" [1]. Road Traffic Regulations were not designed for pedestrians and cyclists in the first place. They were introduced (by powerful lobbies – see criminalization of "jaywalking" [9]) to ensure the ease and flow of motorized traffic, often at the expense of the ease, flow and even safety (see section 2) of non-motorized traffic.
Furthermore, traffic lights are commonly oriented on the traffic volumes of motorized traffic, distributing green times according to the number of cars. Pedestrians are often left with remaining time gaps and long waiting times. Separated cycling paths and pedestrians are often signalled by combined traffic lights oriented on the clearance time of slow pedestrians. Obviously cyclists are discriminated by this arrangement.
So pedestrians and cyclists are discriminated by traffic lights that insufficiently protect them. The obedience of red lights is further diminished when traffic volumes are low and pedestrians would easily find a time gap to cross the street (correlation of -0.73 between traffic volumes and share of red walkers – without early and late starters) [8].
Finally, non-motorized "rule-breakers" almost never receive negative feedback; they nearly never get caught and penalized. On the contrary, walking against red lights saves time and may be safer than inattentively crossing a road on green. The choice of running red lights seems to be a cost-benefit-analysis with the benefit of saving time and exercising the right of self-determination (freedom), while the costs are possible safety threats and the risk of receiving a fine.

3.2 Why can pedestrians and cyclists (safely) disobey rules while motorists can't?

The cost-benefit-consideration provides an explanation to the disobedience of Road Traffic Regulations by pedestrians and cyclists, but it does not explain why motorists practically do not run red lights. The license plate as a means of identifying rule-breakers is often regarded as a measure to increase compliance. License plates for bicycles are by popular opinion believed to ensure the obedience of red traffic lights [3]. But the fact that car drivers violate many other e.g. parking regulations despite having a license plate leads us to question whether traceability is the sole barrier in running red lights.
Obviously there must be some transport mode inherent characteristic that restrains car drivers from crossing against red lights but does not hinder pedestrians and cyclists from doing so. We believe that the ability for perception of the surroundings is crucial.
Pedestrians and cyclists have an unobstructed perception of the environment; they see, hear and even smell their surroundings directly. By having little mass and inertia they are very manoeuvrable. They can quickly accelerate and decelerate. Their line of sight is elevated in contrast to a seated car driver's.
Car drivers on the other hand only have an obstructed view. Through their drivers' perspective they have a low seating position, a limited field of vision and blind spots. Their acoustic perception is obstructed through closed windows or even loud music. Enormous mass and inertia make them rather inert (in terms of reaction) and inflexible road users.
And finally, pedestrians and cyclists are vulnerable. As unprotected, "weak" road users they are at the mercy of motorists, even when they have the right of way. And if they decide to disobey a red traffic light, they mostly exert special care and attention (92% look left and right at a red signal before crossing vs. 67% at a green signal [10]) as they will be most probably the only casualties in an eventual accident.

4 New Road Traffic Regulations

Now that we have identified the existing regulations as discriminating for non-motorized road users and argued that disobeying some of these rules does not necessarily result in an increased number or severity of accidents, we propose a new set of traffic regulations. Following the Viennese goals of Vision zero and target modal split, we deduce measures how to reach those goals. A core principle of the new Road Traffic Regulations should be the promotion of self responsibility and consideration (protection of others). We propose to legalize crossing against red lights for pedestrians and cyclists when not obstructing or endangering themselves or others. Under the same circumstances cyclists should be allowed to treat stop signs as yield signs. To improve the conditions for pedestrians and cyclists, traffic lights should be reduced drastically and replaced by pedestrian and cyclist crossings. As this measure alone does not ensure the safety of non-motorized traffic, the general speed level within the city should be reduced and intersections should be decelerated by design e.g. by raising the intersection plateau or narrowing the cross section.
At the remaining signalled intersections the green times should be designed for active mode needs or at least the turnaround times should be minimized to reduce pedestrians' waiting times.

5 International examples

Depending on the exact wording in the road traffic regulations, walking on red lights is at least not forbidden in some Europeans countries. E.g. in GB, §21 of the Highway Code advises that one "should only start to cross the road when the green figure shows", in contrast to §34 where one "MUST NOT cross or pass a stop line when the red lights show" (emphasis in original) at railway level crossings [11]. According to the Norwegian traffic rules, a red signal means that

one should not start crossing the road when it is not possible without obstructing traffic or involves danger [12]. As no accumulation of accidents is known from these countries, future implementation in Austria could be regarded as safe as in these countries.
For cyclists, right on red lights (at marked intersections) is an uprising concept partially already implemented (as in Hamburg/Germany [13]) and partially in the evaluation phase (as in Brussels/Belgium [14], Paris/France [15] and Basel/Switzerland [16]). No negative effects are known from this measure that allows cyclists to turn right at dedicated intersections even when facing a red light. In the State of Idaho, the Idaho Stop Law is in effect since 1982, allowing cyclists to treat stop signs as yield signs and red traffic lights as stop signs [17]. Also no increase of accidents could be seen there. On the contrary, research shows that cycling is safer in places where the Idaho Stop Law is in effect [18].
Right turn on red (RTOR) is legal for cars in many states of the US since the 1970s [19]. It was implemented during the Oil Crises to save fuel and travel time [20] despite the fact that it increased accidents with pedestrians and cyclists by up to 100% [21]. This indicates that the concept is not as feasible for cars as it is for bikes and that in the USA economic considerations dominate over safety concerns.

6 Discussion in Austria

Ulrich Leth first proposed the idea of legalising red walking in a carefully argued article in an Austrian nationwide newspaper in November 2013 [22]. One week later, public service television and radio took on the topic often reducing the message to "pedestrians should generally be allowed to cross against red lights", which led to a public outcry. Nearly all political parties, both automobile lobbying organisations, the Ministry of Transport and the Austrian road safety association opposed the idea without even seriously considering it [23][24][25]. Not to mention various personal verbal attacks against the author.
The three major reasons for opposing the proposal were: (1) Uncertainty about the accountability of the car driver in case of an accident. This could be easily resolved by reformulating the road traffic regulations accordingly (as in e.g. Great Britain). (2) Working international examples cannot be transferred to Austrian conditions, critics say. (3) The role-model function for children is undermined when adults walk on red lights. This appears to be the only reasonable argument. However, already now children are excluded from the "principle of legitimate expectations" valid in Austria, meaning that a car driver has to exert special care any time approaching a child in traffic. Society should aim at providing a child-friendly traffic rather than produce traffic-friendly children [26]. At least the cycling commissioner for Vienna and the cycling lobby supported the idea of RTOR for cyclists [27][28]. We have learned from this discussion that despite the weaknesses of the current traffic rules (disobedience, lack of safety, etc.) are known, innovative ideas are not welcome and will be instinctively opposed in the first reaction.

7 Conclusion

We started by analyzing a study about red walkers' motives and pedestrian accidents in Vienna concluding that neither green traffic lights nor marked crossings provide pedestrians and cyclists with the intended safety. Partly because of this, partly due to the fact that pedestrians are discriminated by short green times and long waiting times, red lights are often ignored. We propose to legalize this behaviour and reimplement self-responsibility in the road traffic regulations. Pedestrians and cyclists are able to cross red lights and stop signs without safety concerns as they have a direct, unobstructed perception of their surroundings. International examples show that this is feasible and safe. Reactions in Austria show that it is still a long way to go.

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