IS ROADSIDE ADVERTISEMENT IN A CONCEPT WITH SUSTAINABLE DEVELOPMENT (SAFETY) OR JUST A FACTOR OF DISTRACTION AND FATIGUE?

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ABSTRACT

Depends on county in which you are driving and its care for sustainable development, but mostly in developing countries, countries in transition and newly developed countries, you can see a flood of commercial billboards alongside roads. Not only urban areas, but also natural environment alongside roads is becoming less and less user (driver and citizen) friendly. Most of the time care for environment, urban architecture and drivers' safety is neglected and even ignored, due to the advertising lobby (personal interest and financial benefits). What has roadside advertising and sustainable development in common with road safety and distraction and fatigue?
This paper presents our view and correlation between roadside advertisement and road safety; especially the impact of road and roadside environment on distraction and fatigue and how we can with systemic approach (sustainable development) improve road safety.

1. ROADS' FUNCTION

The roads are built for transport and journeys and their primary function is to move people and goods from point A to point B. Thru centuries roads were upgraded and new means of transport were developed in a way to save time and energy. With increased motorization also traveling speeds increased. Alongside with higher speeds road accidents with serious and fatal injuries (KSI's) increased as well. In fact even in the previous century KSI's on roads were considered as the price we had to pay for progress and it did not make any economic sense to keep road users safe. Thankfully, now we know, that roads have to ensure traffic to flow freely and safely and emphasize on safety is getting more and more notable. Preventing KSI's is now, beside social also economic importance and it is a core of Safe System Approach.

In order to achieve safe system (safer roads) there must be a political willpower, proper road safety strategy supported by legislation, funding and knowledge (not only in theory, but especially in practice). So the road operator, not only that it is liable for safe road system, it also must have possibility to responsibly operate with the road system.

According to the Safe System Approach (see Figure 1), if we want an alert and compliant road user, we must provide Conspicuous, Clear, Consistent, and Credible roads. It is very important that roads do not confuse or overload drivers' mental capabilities.

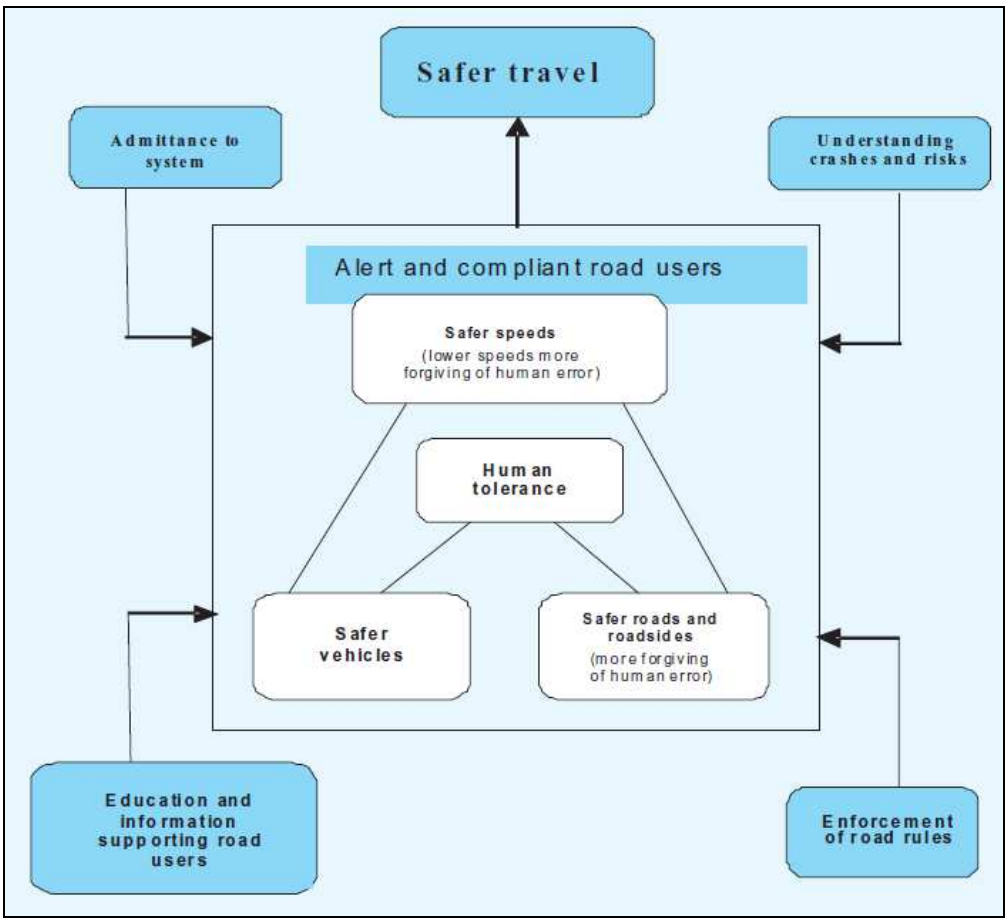

Figure 1 - Safe System Approach
(System results in safer travel)

2. INTERACTION BETWEEN THE ROAD AND A DRIVER

To make safer roads, road operator has to, among other things, ensure that drivers are not confused, distracted or overloaded with too much information while driving. Road design, that is coincidence of roads' elements, such as geometric design, signage etc., must provide to driver clear, understandable and unambiguous information upon which driver can adjust his driving behaviour (speed, attention, awareness of danger etc.) and safely negotiate in traffic.

Drivers perceive road and roadside environment including traffic signs and markings (relevant information for safe driving) mostly true eyes. Drivers do not look at the road and roadside environment in fixated steadiness; they perceive it in motion as overall impression of space or whole environment in a field of view. So, while driving drivers have limited time to see, perceive, process and understand the information. Thereby, for driving we need only crucial or relevant information upon which we can make decisions. Too many or too few information, as well unimportant information for driving, influences on driver and his overall perception and decision making process.

That means, safe roads including road sides (what is in drivers' field of view), has to keep drivers properly stimulated (not under or over stimulated) and provide driving experience that keeps them focused on the driving task.

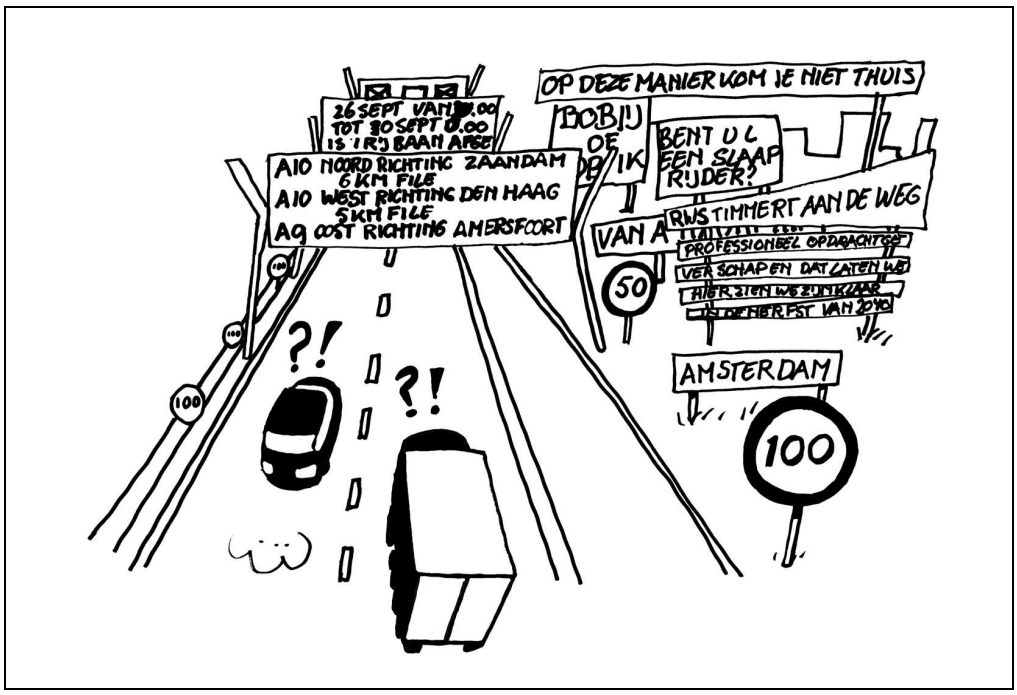

Figure 2 - Tell the road user what is really important [1]
(Too much information overloads drivers' mental capabilities)

2.1. Visual communication and distraction

"Roadside advertising and information billboards are intended to draw the attention of drivers, so that they may have less attention for the actual traffic situation. Studies into behavioural effects of roadside advertising billboards have indeed established that advertising billboards have a negative effect on the observation behaviour of drivers (their eyes lose track of the road more often and for longer periods), their reaction time (in the vicinity of advertising billboards drivers react more slowly to relevant issues) and on vehicle control (drivers more often fail to stay in lane in the vicinity of advertising billboards). These effects occur to a larger extent when it concerns advertising billboards with moving images, which are found in the central field of vision, which contain a (negative) affect-laden message and which resemble a billboard with traffic-relevant information. Also in busy environments with a great deal of complex visual information, it is difficult to detect traffic-relevant billboards." [2]

Figure 3 - Road safety campaign [3]
(Relevant and clear, not distracting information for drivers)

Figure 4 - Traffic signs predominated by commercial advertisements
(Drivers are not capable to see, perceive, and process the traffic signs)

2.2. Overloading drivers mental capabilities

When too much information is in drivers' field of view, than drivers' perception and decision making process is balked. That means drivers are unable to see, perceive, understand, remember and consecutively decide and (re)act in safe manner. Therefore drivers' self-preservation mode is activated; this means that driver subconsciously chooses not to see any information, even important one, for safe driving. Regardless of that the brightness (luminance) of digital billboards, irrespective to mental overload, catches drivers' attention.

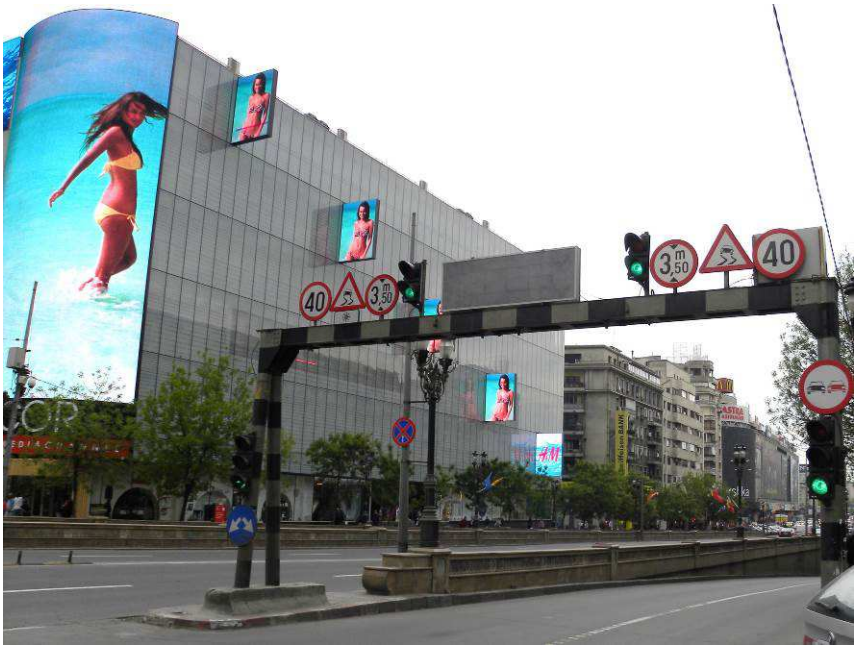

Figure 5 - Digital billboards, irrespective to drivers' overload, catches drivers' attention

Figure 6 - Traffic signs and commercial advertisements
(Directly beside the road)

Even though when overloading drivers' mental capabilities with commercial advertisements are not a direct issue, there are still a factor of distraction and especially the degradation of natural (or urban) environment.

Figure 7 - Traffic signs and commercial advertisements
(In the roadside environment)

3. CASE STUDY

When engineers solve problems regarding conspicuousness and clearness of traffic signage caused by roadside advertisement they have in many countries limited recourses and competence or rights regarding legislation.

In the case study bellow, we'll try to present the problem regarding distraction nearby pedestrian crossing and introduce sustainable solution from road engineering and urban point of view.

3.1. The problem

As seen in the picture below there is a problem regarding conspicuousness and clearness of pedestrian crossing over the state road. Because of the circumstances pedestrian crossing (traffic signs and road markings) are not dominant in the drivers field of view. Prevailing / predominant objects are white building (factory) and commercial advertising (flags and billboards) behind the crosswalk as shown on Figure 8 and 9.

Figure 8 - Object of case study: Roads appearance at pedestrian crossing

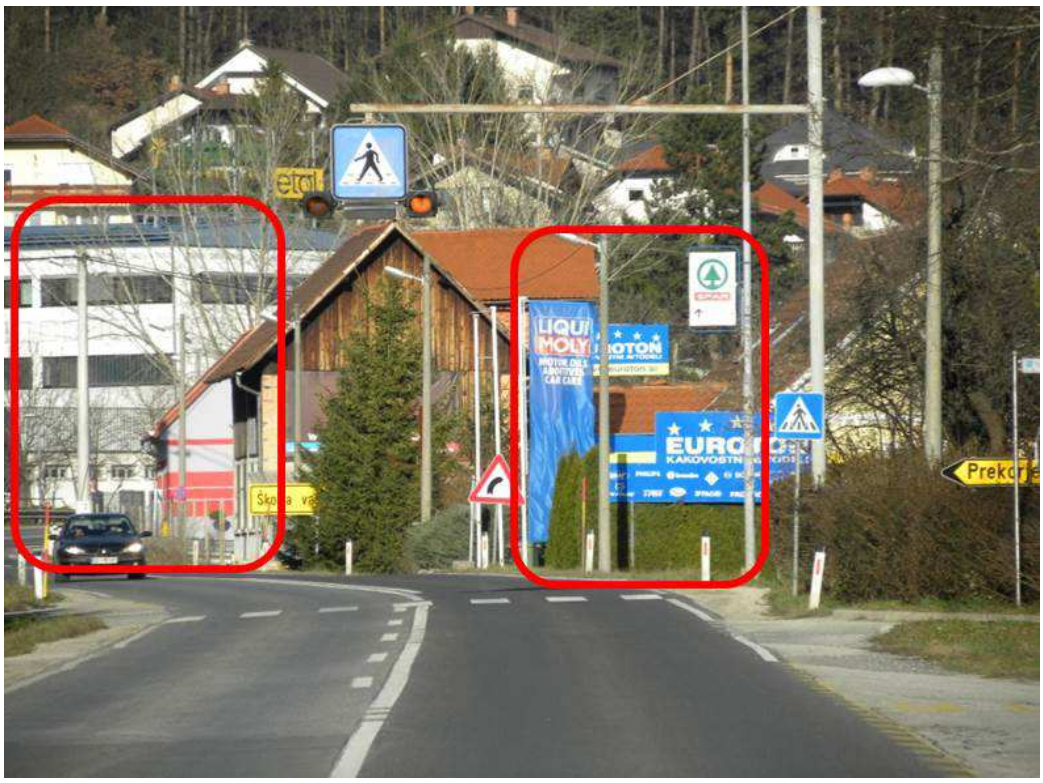

Figure 9 - Dominant objects in a field of view
(The building and commercial advertisements)

3.2. The obvious and feasible solution

The obvious solution and might say the right one is to eliminate all distractors and dominant objects in drivers' field of view. As shown in Figure 10 dominant objects (commercial advertisement) were removed except the white building (factory) which in fact cannot be removed.

Figure 10 - Removal of dominant distractors – those than can be removed

Although this solution is obvious and effective it is not feasible due to legislative problems and competence of a road engineer, so other measures has to be taken.

Therefore engineers have to make pedestrian crossing more visible / conspicuous and by that predominant in drivers' field of view. One of possibilities is to enhance the traffic sign for pedestrian crossing with fluorescent frame / background as shown in Figure 11.

Figure 11 - Making traffic signs predominant in the field of view
(If distractors cannot be removed)

3.3. Improvement of possible solution

By making traffic signs more visible / conspicuous and more dominant in the drivers' field of view, we manage to attract drivers' focus on those signs. As we know that pedestrians walk beside and cross the road, we had to make pedestrian crossing more visible / conspicuous in addition to traffic signs.
To focus drivers' attention more on the road and not so much on the traffic signs posted above and beside the road we enhanced visibility of a road marking / pedestrian crossing (zebra), as shown on Figure 12.

By making road marking more visible / conspicuous and dominant we managed to focus driver attention on the road where pedestrians are. Blue colour is chosen (irrespective to blue surrounding) because it coincides with the colour of traffic sign for pedestrian crossing and gives the overall image and subconscious colour effect of pedestrian crossing.

It is important to mention that advertising (in general and in this case study) is very different and varies depending on the location and it frequently changes as well (see Figure 13).

Figure 12 - Making traffic signs predominant with emphasized road markings in the field of view and with that focus driver's attention more on to pedestrian crossing
(If distractors cannot be removed)

Figure 13 - Changed advertisement
(Blue flags are replaced with red ones)

3.4. Re-examination of proposed solution

As seen in Figure 12 there are many objects that are dominant in drivers field of view and are competing for drivers' attention: white building, advertising, traffic signs and road marking. That means that proper visual communication to the driver is still not achieved. Instead of providing clear, understandable and unambiguous information we manage to make confusion of elements fighting for predomination. By knowing "less is more" we removed unnecessary traffic signs: for pedestrian crossing and warning sign for the curve, which does not have to be set up in towns according to our legislation (see Figure 14) and consequently disburden drivers' perceptual and mental capabilities.

Figure 14 - Removal of unnecessary traffic signs
(Sign for pedestrian crossing and warning sign for the curve)

3.5. Sustainable solution

Going towards the concept of Safe System Approach and Sustainable development we should strive to implement so called "Self-explaining roads" into the road design, to keep drivers properly stimulated (not under or over stimulated) and provide driving experience that keeps them focused on the driving task and what is important for safe driving. By that we came with the sustainable solution as shown in Figure 15, which is composed of obvious and proposed solution, previously described. By sustainable solution the road signage (markings and signs) and roadside environment (commercial advertisement) are properly managed. Conspicuous pedestrian crossing together with clear environment give the driver proper information and as such serves as a countermeasure for the dominant object (white building – factory) that cannot be removed.
It is important that road marking material has good anti-skid properties and sufficient light reflectivity during the night.

Figure 15 - Sustainable solution
(Without commercial advertisements, unnecessary traffic signs and with conspicuous road markings to capture driver's attention)

By this solution we managed to clear our driving environment and provide understandable and unambiguous information to the driver, which is the concept of sustainable development and road safety. Sustainable road safety is in fact a harmony between: Driver, Vehicle, Road and Environment.

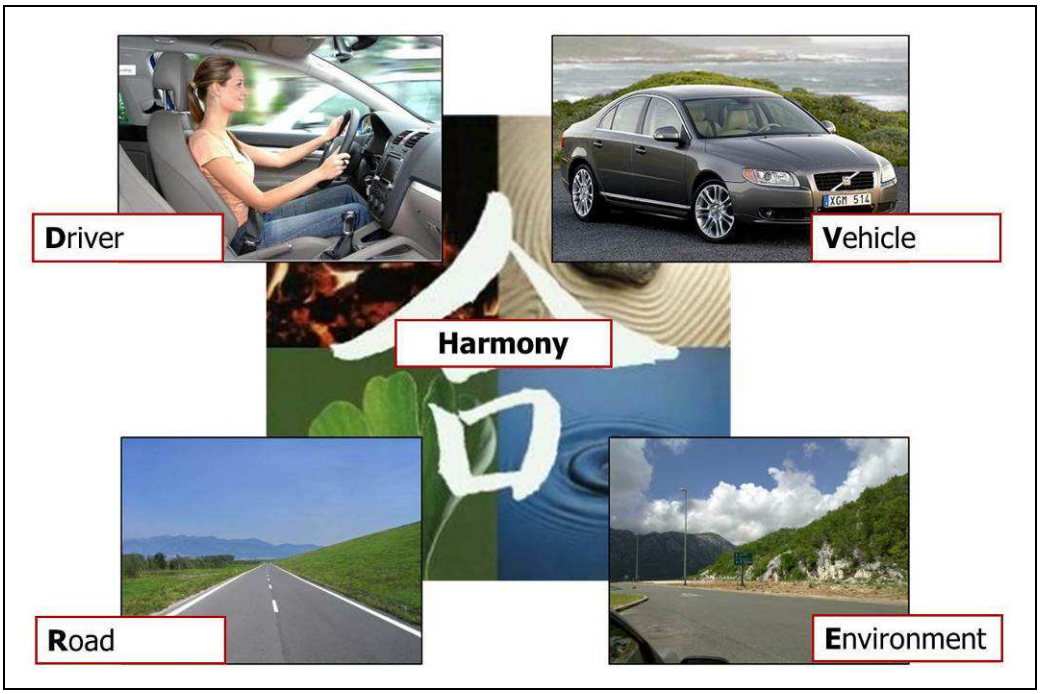

Figure 16 - Sustainable road safety
(Harmony between: Driver, Vehicle, Road and Environment)

4. CONCLUSION

“Because advertisements and billboards in the road environment are liable to distract drivers or limit the visibility of road markings, the authorities should take measures to ensure that such advertising and billboards do not reduce the visibility or effectiveness of regulation signs, do not dazzle road users and do not attract their attention in conditions jeopardizing road safety. Article 4 (d) (ii) of the Convention on Road Traffic of 1968 obliges the contracting parties to take measures in this regard, but it gives no indications about what measures to take.” [4]
“To provide for some level of oversight, the posting of advertisements in the road environment should be subject to an administrative authorization issued by the competent authorities.” [4]
“In the interest of road safety, it is recommended to prohibit advertising in any form:
(a) containing directions for a locality that include either an arrow or an indication of distance;
(b) containing a reproduction of a road sign or road sign symbol;
(c) using shapes, sizes, colours, words, symbols that are liable to be confused with road signs or traffic lights.” [4]

It is a fact that driving is energy consuming process. Road environment with lot of information demand from driver more effort and energy to process and decide what is relevant for driving. With energy consumption drivers get tired sooner and fatigue sets in earlier.

So at the end we can conclude that roadside advertisement is not in a concept of sustainable development (safety) and it is just a factor of distraction and fatigue.

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