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EVALUATION OF NEW RTI EQUIPMENT WITHOUT ACCIDENT DATA AT DISPOSAL

1. A look on what we did and what we do

Traditional safety strategy in road traffic can, a little ironically, be summarized as follows:

- a we develop some equipment (start with the first car, or with the first roads constructed for cars),
- b we develop at the same time some laws which guarantee that technically speaking no accidents will happen if all traffic movements are performed according to law,
- c we renounce in asking ourselves how high the probability is that road users will keep to the law,
- d we find that many things do not work out, nevertheless: technical failures (in the beginning) and human "failures" (ever since the beginning) caused and cause problems,
- e we renounce in or do not think of reflecting or controlling the fact that wishes for higher speeds - or shorter travelling times - and improved mobility - develop parallelly to technical development,
- f we refuse to see the relationship between "unlimited" mobility and speed - and their attractivity for car users - on one hand, and lack of safety on the other hand; however, industry is mainly interested in this attractivity and its relation to product selling,
- g we tend to think that we have to accept the conditions "increasing speed", "sales strategies", "road users' interests" (meaning "car drivers' interests") when we pursue our safety work,
- h we realize that accident numbers per capita in our countries grew, at first, and than more or less remained stable, without any relevant reduction of numbers of people injured or killed in road traffic,
- i we collect accident data hoping that they give us information about what went or goes wrong, and why so many people are injured or killed in road traffic,
- j we have lived for a long time with the fact - knowingly or not - that accident data do not give those information about behaviour and interaction and their relation to traffic and social system in a satisfying way, however,
- k we still try to correct the system and to "correct" the road users based on the knowledge we gathered from accident data, nevertheless
- l we have learned that data describing road users' behaviour and interaction - from observations, interviews, etc. - are in practice not accepted by authorities, road

constructors, industry, and others, as indicators for necessity and type of countermeasures and changes because their validity with accident data as criteria cannot be proved,

- m we know that in other areas of traffic (railway, aviation, public means in towns and cities) such a system as described above - to collect accident data and then to try to improve the system - would never be accepted,
- n we explain this difference saying that in road traffic it is people themselves that have to decide in a democracy - forgetting how many people are injured or killed by other people without getting a chance to decide themselves,
- o we also explain this difference relying on the assumption that in road traffic accident costs are borne by the road users themselves - an erroneous assumption, as we know by now - whereas in all sorts of public transport the companies are responsible,
- p we have no adequate philosophy and models for tackling the "freedom" aspect which has infiltrated road traffic: that "in road traffic people should decide and choose themselves and authorities should not interfere" (see n as well),
- q we have no sufficient knowledge to tackle this aspect of freedom in respect to how people behave under certain environment circumstances, how they use certain equipment, how they react to other road users, etc.

2. New technologies could be a starting point for new strategies

The description given here is not the only possible one, of course. But that is not the aim of this paper. What is decisive is the question how one should do better. In connection with the two European programs PROMETHEUS and DRIVE we will get the chance to show that we can do better.

Why that? The new equipment that will be developed within the named programs has not been "involved" in accidents, so far. And it is very doubtful that industry will wait for accidents. Customers are more self conscious today than in former times, the probability that producers of new equipment will be questioned before courts in case of accidents is higher than in former days. So producers will make sure that their equipment does not affect safety negatively before accidents happen. And they will ask traffic-safety specialists for help. Us.

What can we do in such a case?

We have to redefine safety: We must not accept a prolongation of the philosophy that safety somehow is a lack of accidents. Safety is, according to one way of redefinition, a characteristic of the behaviour and interaction of road users. Behaviour and interaction, on the other hand, can be observed and judged with respect to the safety or unsafety they reflect (e.g. CHALOUPKA 1990, CHALOUPKA et al. 1990, DRASKOCZY et al. 1989, or as an example for an application MUHLRAD 1990). Of course one can say that that is not the ordinary scientific way. But this comment is only valid if one wants natural-scientific accuracy in behavioural science. We know today that it is quite a useless effort to apply natural-scientific accuracy standards when we try to understand human behaviour. Moreover, analyzing accident data and

behaving as if they were giving the information we need is not the scientific way, and thus not very useful, either.

We can use two important perspectives for judging (un)safety of behaviour and interaction:

- * The passenger perspective: As passengers we are much more critical towards the behaviour of people in road traffic than when we drive ourselves (any theory to be developed around this phenomenon will have to deal with the "locus of control"-questions we know from attribution psychology.)
- * The safety research perspective: During years of research we have learned that certain types of behaviour and interaction are dangerous, and that certain types of interactional events are indicators for the existence of risk, or danger (e.g. HYDÉN 1987).

3. No proof and no certainty, but some understanding

What we still are looking for is the final "proof" that using the two perspectives named above helps us identify behaviours and interactions that "really" are dangerous. And what we should fight against is the attitude that until we have found this final proof we cannot proceed to implementing countermeasures. We know very well that for many principles according to which we live - and which unanimously are judged useful - there is no final proof in a natural-scientific sense (educational principles, etc.). If we say: Respect certain rules when educating your children and they won't become physically aggressive, we have no final proof either. Still, certain principles are included in the laws of almost all European countries: You are not allowed to beat your children, e.g.

The same is certainly valid for road traffic: The assumption is, that it is possible to recognize behaviour that is safe, both from the individual and from the system point of view, and - as a necessary complement - to recognize unsafe behaviour (e.g. RISSER & CHALOUPKA 1990).

I will relate the following thoughts to the problem of speed: One type of behaviour that happens so often that it has to be looked upon as "normal" per definitionem is speeding, or travelling with inadequate speed, respectively. These are two very different aspects, however. Speeding could be looked upon as breaking an abstract rule, where the immediate necessity for road safety might not be transparent, whereas "inadequate" speed should be recognizable in the moment it happens - otherwise it would not be "inadequate". And if it is recognizable it must also be describable. However, we know how bad an instrument language is to describe body-language aspects, for instance. To say, that roughly "the car driver has travelled so fast that he forced the pedestrian to stop", is much easier than to explain the process of "forcing a pedestrian to stop" in detail.

However, the case of forcing others to do something, or to abstain from doing something, has to be classified as dangerous in traffic: It is causing conflicts, and the methods for solving conflicts in road traffic are very restricted (RISSER 1988). In our

case of forcing, both participants could just move on, insisting on what they think is their right, until it comes to a collision. Nobody wants that collision, most probably, but if insisting goes too long, measures to avoid a collision might happen too late, when human reaction ability does not suffice any longer.

4. A semantic perspective

This example is transferable to other areas where the concept of adequate speed comes in. But exactly what is "adequate speed"? Could we define it as an "adaptation of speed of such character, that all interactions and all coordination can be done without the risk that human reaction capability might not suffice"? For a law, this is a very unprecise rule. For a technician, it might not be very satisfying, either. For a psychologist, however, this should look as quite an ordinary problem. And as a psychologist I would say: Standards that go according to the definition above have to be learned in practice (by observers, driving teachers, etc.) who have to be in close contact with each other, learning and gathering knowledge about behaviour and interaction as we would like it to be. (Video technique today could make such communication processes between experts quite easy).

I want to point at two very important aspects, however:

- 1 The problem of speeding, generally: How do you classify "not obeying the rules"? In railway traffic or in aviation you would judge not obeying the rules as being a very critical behaviour quite decisively. But why should speeding be "a critical behaviour" in road traffic? That has to be discussed (e.g. SCHMIDT 1987).
- 2 It is quite likely that road users start applying strategies that are not in line with a behaviour strategy wished by the experts as soon as there is not sufficient control: We know that social feedback is almost totally missing in road traffic, and that there are strong tendencies to act impulsively instead of acting according to certain abstract rules.

In aviation and railway traffic which I cited above mechanisms to control behaviour of acting persons are the rule and not the exception (e.g. ZUZAN 1988). In relation with road traffic control is difficult to achieve however. In many cases there is even opposition to control (e.g., from the car drivers' side).

5. It is the road users' behaviour that interests us

New equipment is mostly developed to support car drivers' skills. However, we must not forget that car drivers might use the equipment in a way that this support of skills ends up with negative effects: delegation of responsibility, reduction of communication (and thus increase in risk where the individual has to improvise), imitation by non-equipped or unskilled drivers, transfer of habits to areas where an equipment might not help, etc.

What we have to accept is that a behaviour modification based on these principles is

risky "only" according to the experts' opinion, and that we have not yet any accident data to support this assessment. But methods based on such expert assessments are the only thing we have to evaluate new equipment.

How could one proceed when interested in behaviour and interaction and their effects on safety?

- 1 One has to choose criteria for deciding if behaviour is desired or not. Two criteria have been used in the past in this respect:
 - a) What is behaviour like according to the laws? A new equipment must not turn out to be an enforcement for obeying to the laws less than before (when driving without the equipment)
 - b) What is behaviour like in unclear situations, when stubbornness, lack of skills, or misunderstanding of situations by other road users - who might not even be visible for the car driver momentarily - could lead to collision potentials? One can understand that changes of speed are essential in this connection.
- 2 One has to choose methods to analyze a) and b). Many studies have been done already in order to develop and practically use such methods. Without going further into detail the following methods can be named:
 - Behaviour observation out of the car
 - Video registrations
 - Automatic registration of car movements
 - Interviews after test rides
 - etc.

If equipped cars are sufficiently frequent and well identifiable one could think of observations on the road, as well (as an example for a field study going on right now see ALMQUIST et al. 1990).

Within DRIVE and PROMETHEUS, and before these two programs started, as well, a lot of theoretical work dealing with the question, what "desired behaviour" actually is, has been done. So the aim in future evaluation work without accident data is not to "discover the driver model". Know how rather has to be collected and summarized in a way that it can function as an adequate base for evaluation work. Moreover, one has to include interaction aspects and social or socialization principles in one's assessments.

6. Maybe law experts can help us

However, one point has to be added: The outcome of analyses will be judgements in terms of plausibility. If, hypothetically, products are critically discussed before a court - let us say, because accidents have happened where these products were involved - producers will be able to show, that they have tested their products in line with the knowledge there is. The responsibility then will be on the behavioural- or social-science experts' side. It will be necessary then to prove that the intention of the analyses done was wholly according to the laws.

So, what the author of this paper would like to get is also a juridical expertise pointing out that far from all official safety work in road traffic today is done according to fundamental laws (like protection of life, etc.). This should make it much more easy to point out in detail, that it is the intention that counts more than the outcome (e.g. VISKI 1982):

- o If the intention of the producers of an equipment really is to support "desired" behaviour, then accidents really are "accidents" per definitionem, namely events nobody could foresee.
- o If, on the other hand, acting ruthlessly as an almost natural outcome of the fact that responsibility is delegated to the equipment is the result, "accident" becomes something very critical.

Our methods will have to be very sophisticated in order to find out in advance what one should expect for the future.

References

ALMQUIST S., HYDÉN CH. & RISSER R. 1990, A speed limiter in a car: Phase II, Effects on drivers' behaviour and interaction, Dept. for traffic planning and engineering, University of Lund

CHALOUPKA CH. 1990, How to identify risks by observing human behaviour and interaction, I C T C T, Vienna

CHALOUPKA CH., HYDÉN CH. & RISSER R. 1990, Die PRO-GEN Verkehrs-sicherheits-Checkliste, ZVS 1, 1990

DRASKOCZY M., HYDÉN CH. & RISSER R. 1989, Formulation of safety objectives, DRIVE-Project 1040, Bulletin 85, University of Lund

HYDÉN CH. 1987, The development of a method for traffic safety evaluation: The Swedish traffic-conflicts technique, Thesis, University of Lund

MUHLRAD N. 1990, Systematic behavioural observation: The S B O T experimented in the Philippines, in: I C T C T, Theoretical aspects and examples for practical use of traffic conflicts and of other interactional safety criteria in several industrial and developing countries, Proceedings of the 2nd Workshop of ICTCT in Munich, Bulletin 86, University of Lund

RISSER R. 1988, Kommunikation und Kultur des Straßenverkehrs, Literas Universitätsverlag, Wien

RISSER R. & CHALOUPKA CH. 1990, Zur Entwicklung eines Instrumentariums zur Identifizierung gefährlicher Verhaltensweisen, ZVS 3, 1990

SCHMIDT L. 1987, Verantwortliches Handeln im Straßenverkehr, Bericht zur Vorstudie des Forschungsprojektes 8516 der BAST, Bergisch-Gladbach, Wien

VISKI L. 1982, Road traffic offenders and crime policy, Akademiai Kiado, Budapest

ZUZAN W.D. (Ed.) 1988, Psychologie und Verkehrspsychologie, Literas
Universitätsverlag, Wien