International Road Federation Road Safety Committee
Driver Behavior, Education and Training Subcommittee
Eddie Wren – Subcommittee Chair

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Although the International Road Federation (IRF) has not conducted its own investigation, the IRF has reviewed and now endorses the concept detailed in the attached paper. This position is based upon extensive supporting documentation regarding the inadvisability of any training programs that teach drivers how to respond in emergency situations, including research by Elvik, et al (2009), Gregersen (1996), and Mayhew and Simpson (2002). The resolution is contained below:

> *Training programs aimed at enhancing the skills to regain control in emergency situations should not be included in basic driver education nor in post-test driver training programs. The learned skills from such training programs erode quickly, and the noted training programs result in more risk taking due to driver overconfidence. Basic driver education and post-test driver training should be aimed at improving the calibration skills of both learner drivers and novice drivers. Well-calibrated drivers can detect latent hazards in traffic situations, do not underestimate the likelihood that these hazards will cause adverse effects (i.e. they are aware of the risks), and do not overestimate their own skills (i.e. they are aware of their own limitations).*

A copy of the paper is shown below.

<u>References</u>

Elvik, R., et al. (2009). *The handbook of road safety measures*. 2 ed., Emerald Group Publishing Limited, Bingley, UK.

Gregersen, N.P. (1996). *Young drivers' overestimation of their own skill--an experiment on the relation between training strategy and skill.* In: Accident Analysis & Prevention, vol. 28, nr. 2, p. 243-250.

Mayhew, D.R. & Simpson, H.M. (2002). *The safety value of driver education and training.* In: Injury Prevention, vol. 8, nr. suppl 2, p. ii3-ii8.

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Training drivers to have the insight to avoid emergency situations, not the skills to overcome emergency situations

Executive Summary

Emergency situations are situations that require immediate action to regain control over the vehicle and/or that require immediate action to avoid a crash. Driver training that aims to enhance the skills to regain control in emergency situations such as skid training, evasive swerving and emergency lane changes has proven not to be effective. Moreover, there is a plenitude of evidence that crisis evasion courses can actually increase crash rates. However, driver training that aims to enhance risk-awareness, self-awareness and the acceptance of low levels of risk can reduce the crash rates of young novice drivers. As driving is predominantly a self-paced task, technically skilful drivers are not necessarily also safe drivers. A not too technically skilful driver (i.e. a driver who has moderate vehicle handling skills) who does not overestimate his or her capabilities and/or does not underestimate the risks, drives safer than a skilful driver who overestimates his or her capabilities and/or underestimates the risks.

The Driver Behaviour, Education, and Training Subcommittee has declared that training programs aimed at enhancing the skills to regain control in emergency situations should not be included in basic driver education or in advanced driver training programs; because, the learned skills in such training programs erode quickly, and such training programs result in more risk taking due to overconfidence. Basic driver education and advanced driver training should be aimed at improving the calibration skills of learner drivers and novice drivers. Well-calibrated drivers can detect latent hazards in traffic situations, do not underestimate the likelihood that these hazards will cause their adverse effects (i.e. they are aware of the risks), and do not overestimate their own skills (i.e. they are aware of their own limitations).

Driving is predominantly a self-paced task

For experienced drivers, driving may feel almost as natural as walking. Although it may feel easy for experienced drivers, driving is a complex task. It is in fact one of the most complex skills we ever acquire in our lives (*1*). Although it is a complex task, it is not so much lack of vehicle handling skills that makes young novice drivers crash (e.g. crashes due to loss of control) but rather lack of higher order skills such as poor hazard perception, poor risk awareness and poor self-assessment (*2-3*).

Driving a car requires that visuo-spatial systems, manual processing systems and recognition systems are active in the brain in order to keep the appropriate trajectory and speed. What the appropriate trajectory and speed are depends on the intentions of the drivers, the road and traffic situation, the status of their own vehicle (e.g. its speed) and their own personal status. Their own status is determined by their competences (e.g. skills and abilities), their personality and their state of mind at that moment in time (e.g. drowsy or vigilant, being under the influence of psychoactive substances such as alcohol or not, distracted or attentive, emotionally aroused or not, etc.). Drivers have to monitor the traffic situation, the status of their vehicles and their own status constantly. They not only have to monitor the traffic environment and their capabilities constantly, but they also have to balance the two. To a large extent, drivers themselves determine how difficult and/or risky the driving task gets. When for instance a driver starts to drive faster, the task will usually become more complex and risky. Normally, a driver does not want to exceed his or her own abilities and experience feelings of loss of control (*4-7*). In order not to lose control, the driver balances the task demands (risks) and his or her capabilities. This balancing of capabilities and task demands based on self- assessment and risk assessment is called calibration (*7-9*). In fact, a driver does not balance risks (task demands) and capabilities, but balances perceived capabilities and perceived risks. When both the

perceived capabilities completely coincide with the real capabilities and the perceived risks completely coincide with the real risks, a driver is well calibrated. This is the case when in Figure 1 both the boxes of 'Real task capabilities' and 'Perceived task capabilities' overlap and the boxes of 'Real task demands / risks' and 'Perceived task demands / risks' overlap. Such a driver does not underestimate or overestimate his or her own capability and does not underestimate or overestimate the risk of a traffic situation.

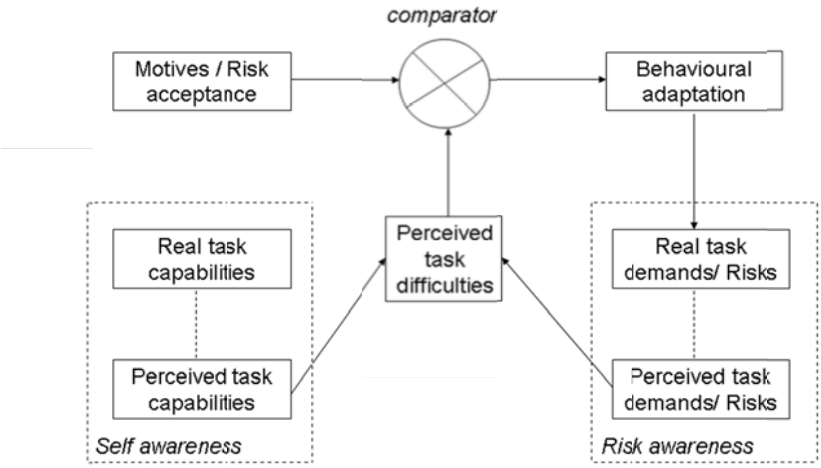

Figure 1 ***Calibration***

As such, good self-awareness and good risk-awareness (based on good hazard perception skills) are not enough to be a safe driver. Drivers also have to accept low levels of risk and have to be motivated to drive safely. This normative and motivational aspect of calibration is depicted by the upper left box in Figure 1. Drivers compare the perceived task difficulties (a result of the balancing of risk-awareness and self-awareness) with their norms and values about safe driving. If the perceived task difficulties exceed what they accept as safe, they will adapt their behavior (e.g. reduce their speed). Most of the times the decision to, for instance reduce one's speed is not a deliberate intentional action, but an automatic action based on feelings of discomfort (*10*).

How effective are crisis evasion courses such as skid training?

Until the end of the 1980s, every novice driver in Norway was required to follow a course for driving on slippery roads. This mandatory training was in fact skid recovery training. This training was evaluated. To the surprise of the researcher, the crash data showed that novice drivers had more crashes rather than fewer after having attended the training (*11*). A similar adverse effect of a short mandatory skid recovery training for novice drivers was found in Finland (*12*). A short mandatory skid recovery training that was especially developed for truck drivers in Norway also appeared to increase the crash rate (*13*). Elvik, Høye, Vaa and Sørensen conducted a meta-analysis on the effect of special skill training programs for drivers such as skid recovery training programs and evasive swerve training programs (*14*). Six studies were included in this meta-analysis. All training programs appeared to have an adverse effect on crash rate. The least adverse effect was found for special skill training for passenger car drivers (12% increase of the crash rate). The worst effect was found for skill training that was especially developed for ambulance drivers (45% increase of crash rate).

Why do short special skill training programs for drivers have an adverse effect?

Mayhew & Simpson (*15*) provide the following explanation why short special skill training programs have an adverse effect. They write: "It has been suggested that training new drivers, particularly in emergency manoeuvers and collision avoidance techniques, fosters overconfidence and thereby increases risk rather than reduces it. For example, evaluations have found that advanced training in skid control does not reduce crash involvement. One possible explanation for this finding is that situations that precipitate the need for emergency skills arise infrequently, so the requirement to deploy these skills is also infrequent. And, given that there is poor retention of skills that are used infrequently, advanced skills learned over a relatively short period of time may tend to erode and not be readily available or inappropriately applied in emergency situations one or two years later." As observed by Christie (*16*), "drivers quickly forget those behaviors that they do not have to use regularly. This is not unique to driving, people lose competence in respect to any set of skills which are not practiced, or are engaged in only rarely" (p. vi). But perhaps of greater importance, the results of several evaluation studies show that course graduates actually have higher collision rates than individuals who did not receive such training. An explanation for these findings is that advanced skills training leads to overconfidence that may eliminate normally cautious behavior. It can also result in a greater willingness to put oneself at risk. For example, graduates of advanced skill courses will be less reluctant to drive in adverse conditions because they are confident that they can handle them." Thus, rarely used skills do not retain. However, the belief one masters those particular skills because one has attended a course, does retain. The result is overconfidence. When it is dark and it snows, a driver who has attended skid training may think 'I have learned to control a car in difficult circumstances' (although he or she has actually already lost those skills) and will drive, whereas someone who has not attended such a course may think 'I'm not such a good driver and I cannot control a car on slippery roads and will stay home. A third explanation may be that when aroused and a quick response is required, people tend to react by reflex. Most of the times, actions required to control a car in emergency situations are counterintuitive. If the actions to control a car in emergency situations are not overlearned by mass practicing and have not become a routine action, the wrong action will be executed, even if one knows what one is doing is wrong.

The above offered explanations for the adverse effect of for instance skid recovery training are not mere speculations. In an experiment, Gregersen (*17*) compared two different advanced driver training programs. Participants were randomly assigned to either a training program of 30 minutes that was intended to make the learner as skilled as possible in handling a braking and avoidance manoeuvre in a critical situation or to a training program of 30 minutes that was intended to make the driver aware that his or her skills in braking and avoidance in critical situations are limited and unpredictable. The former was called the 'skill group' and the latter was called the 'insight group'. One week later, the drivers returned to take part in a test of their estimated and actual skill. The 'skill group' estimated their skill higher than the 'insight group'. No difference was found between the groups regarding their actual skill. These results confirm the hypothesis that skill training strategy produces more false overestimation than the insight training strategy. One could argue that skill and insight are two different aspects and that both types of training programs are necessary. However, McKenna, Horswill and Alexander (*18*) found that skill and insight are not independent from each other. A skill training that was intended to improve hazard perception skills of drivers resulted in less risk taking whereas training programs to improve motor skills result in more risk taking.

How effective are advanced driver training programs to improve risk-awareness, self-awareness and the acceptance of low levels of risk?

Young novice drivers are overrepresented in crashes. In OECD countries[1] in 2004, 27% of all driver fatalities were drivers younger than twenty-five years of age, whereas the proportion of persons older than the minimum age for driving but younger than twenty-five in the population was 10% (*19*). In order to tackle this problem in the United States, Canada, Australia and New Zealand, graduated driver licensing (GDL) programs were developed. In most countries in Europe a different approach was chosen to tackle the young novice driver problem. Due to the fact that in most countries in Europe the minimum age for driving is 18 years of age, elements of a GDL-program such as accompanied driving and solo driving with restrictions (e.g. not with friends, not during hours of darkness) are more difficult to realize than in countries with a lower age limit. One of the ideas to tackle the young novice driver problem in Europe was a mandatory post licensing training about six months after initial licensing. In order to develop such a program, a European research program was launched that was called ADVANCED. According to the researchers of the ADVANCED-project, such a post licensing training should ideally consist of a self-evaluation of the learner before the training, a test drive with a driving instructor in real traffic to evaluate the driving style of the learners, an on-track training and a group discussion. The intended on-track training was not skid recovery training or evasive swerve training but training in avoiding critical situations. It was the intention to let learners feel how little it takes to lose control and that nothing can be done to regain control. In principal, no techniques were learned to regain control. Ten golden rules for post licensing training were drafted (*20*). These rules are:

1. A good course should be varied, highly interactive, self-analytical and held in a relaxed atmosphere.
2. Group sizes (trainer: participant ratio) should be small enough to allow for individual attention and for intensive training, but large enough to facilitate stimulating group discussion.
3. Practical track exercises should be considered more of a starting point for the learning process than a complete process in itself. Each exercise should be followed with discussion.
4. Keep discussion, where possible, in a classroom in order to minimise distraction and maximise on focus. Write participants' comments on a whiteboard (or otherwise) so the "group results" can be seen and more easily retained.
5. Creative track exercises can and should be used to raise risk awareness and self-awareness.
6. Check for undesirable side effects of training.
7. Check for course elements that may lead to overconfidence.
8. Use a range of locations and teaching methods (track training, discussions, case studies, problem-solving, self-evaluation questionnaires, videos + discussion, on-road training and driver observation, etc.) and limit individual sessions to maintain participants' concentration.
9. A good ending is vital: a relaxed, (not rushed!) session where the experiences and views of the training can be shared, summarized and discussed.
10. AND REMEMBER: Even courses designed to focus risk awareness can be perceived as skills based courses by participants. It is not the message that is delivered, but the message which is received by the participants that counts. Constant participant feedback and course evaluation are necessary!

These ten golden rules of the ADVANCED project clearly show the concern that, if a course is not extremely well designed, overestimation of one's own skills is encouraged, and the effect on road safety will be the opposite of what is intended.

[1] Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom and the United States.

In Finland, a compulsory post-license training course was introduced in 1989. It was largely used as the model for the ten golden rules of the ADVANCED project. Novice drivers are required to follow this course between six months and two years after initial licensing. The course consists of a self-evaluation, a so-called feedback drive in real traffic with a driving instructor in order to evaluate the driving style of the learner, on-track training not to be intended to learn skills but to raise risk-awareness and self-awareness, and a group discussion. A similar and even more elaborate compulsory post-license programme was introduced in Austria in 2003. The Finish post-license training does not seem to have reduced the self-reported crash rate considerably, whereas in Austria the introduction of the training seems to have reduced the self-reported crash rate (21). It is worth noting that a Dutch evaluation study was also performed regarding voluntary post-license training (22). This Dutch post-license training consisted of:

1. A driving style analysis. This analysis was based on a forty-minute drive in traffic, followed by a 25-minute evaluation. During the drive, the participant was observed by an examiner of the Dutch Driving Test Organisation (CBR) or an experienced driving instructor, and by a fellow participant.
2. On-track training aiming at letting participants experience how easily, for example, a car can skid and how little can be done about it. This training was not intended as a skills training. And,
3. A group discussion intended to let the participants reflect on their own behaviour and attitude in traffic.

Overall, this post-license training had no effect on attitude, self-assessment and risk acceptance. However, more detailed analysis of the data showed that the post-license training provided at one of the two locations resulted in more cautious driving, whereas post-license training provided at the other location resulted in more risk taking. The instructors at the former location did believe in the ten golden rules of the ADVANCED-project, and the instructors at the latter location did not believe in the ten golden rules of the ADVANCED-project and would rather have provided skid recovery training. It is possible that differences in the instructors' motivation may have influenced the results at the two locations. In the UK a voluntary post-licensure training program with the emphasis on higher order skills such as situation awareness, risk acceptance and hazard anticipation, was evaluated (*23*). Drivers who had attended the training program showed better situation awareness and better hazard anticipation skills than drivers who did not attended the course.

It can be concluded that higher order skill training with the emphasis on risk-awareness and self-awareness, in contrast to special skill training such as skid recovery training, at least has no adverse effects. Further, there are indications that these courses indeed seem to improve situation awareness and hazard anticipation. However, so far there is no clear evidence that higher order skill training with the emphasis on risk-awareness and self-awareness reduces crash rate. Maybe track training should be abandoned altogether as track training intended to raise risk-awareness and self-awareness can easily be misinterpreted by participants as skill training. Hazard anticipation training in a simulator (*24-25*) or PC-based hazard perception training and risk-awareness training (*18, 26*) does not seem to result in overconfidence.

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