

Alcolocks: factors influencing implementation, participation and compliance

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Literature review contributed to the EU project Alcolock Implementation in the European Union

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Summary

In 2004-2005, a series of alcolock field trials were conducted in four European countries, in the framework of the EU research project *Alcolock Implementation in the European Union*. This project was granted by the European Commission, Directorate-General for Energy and Transport (DG-TREN). As part of the project, SWOV conducted a literature review of alcolock programmes, aimed at identifying the most important factors influencing acceptance, implementation, participation and compliance. The results of the literature review can be considered as complementary to the results of the field trials.

Regarding the *acceptance* and *implementation* of *alcolocks for drink driving offenders*, the following factors play an important role and should be addressed accordingly:

- The cost of alcolock programmes to participants.
- Increased recidivism rates after alcolock removal from the vehicle.
- Opposition by the criminal justice system.

With respect to *participation* and *compliance*, the 'ideal' alcolock programme for drink driving offenders based on findings in the literature would be:

- Mandatory, successful completion of the programme being a condition of full licence reinstatement.
- Tailored to distinctive target groups (varying from first to alcohol-dependent offenders).
- Flexible in duration.
- *Not* preceded by a (lengthy) period of hard suspension.
- Administered by licensing authorities.
- Recorded on the driver's licence.
- Regularly monitored, including medical assessments for alcohol-dependent drivers.
- Combined with some kind of rehabilitation.

Commercial alcolock programmes seem to be easier to implement than offender programmes. In Sweden, after the introduction of a small-scale demonstration project subsidized by the government, implementation was successfully left to market parties. Alcolocks were promoted as a tool for quality assurance. Discomfort to the drivers and the risk of economic loss to the fleet owners were minimized by programming the alcolocks' software accordingly. At an early stage, discussions were arranged between public and private parties and interest groups (like trade unions), and actual alcolock users and their social environment were informed.

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1. Introduction

The present literature review was conducted in the framework of the EU research project *Alcolock Implementation in the European Union* (Silverans et al., 2006). The review aimed at identifying the most important factors influencing the implementation of alcolock programmes, participation rates, and compliance with the programme conditions and, after the ending of the programme and removal of the alcolock, with drink driving laws.

The results of the literature review can be considered as complementary to the results of the field trials that have been conducted in Belgium, Germany, Norway and Spain, and to the recommendations for increasing social acceptance resulting from an earlier research project into the feasibility of alcolock implementation in the EU (Bax et al., 2001).

The background of the EU research project is the fact that the effectiveness of alcolocks is not only dependent on the extent to which they prevent drink driving by drivers of alcolock-equipped cars, but even more so on participation rates among eligible drivers. Participation among drink driving offenders is, in the first place, dependent on the availability of alcolock programmes as a sanction. This generally means that such programmes have to be implemented by national governments, which is in most EU countries only possible after an amendment of traffic laws (Bax et al., 2001). Therefore, awareness and acceptance among government, parliament and the general public play an important role. Once alcolock programmes have been implemented, participation rates may depend on awareness and acceptance among public prosecutors and judges, even if these programmes run under administrative rule. Especially long periods of licence suspension ordered by the courts may endanger alcolock programme participation. The next important step is that offenders who are ordered to install an alcolock, really do so. And, finally, the effectiveness of alcolock programmes depends on compliance with the conditions of the programme and, after the programme has ended and the alcolock has been removed from the vehicle, with drink driving laws.

In recent years, the acceptance of alcolocks by European car drivers has gradually grown. According to the SARTRE survey, in 2003, 34% were strongly in favour of alcolocks, against 22% in 1997. The highest acceptance level in 2003 was found in Sweden, where 65% of drivers were strongly in favour of alcolocks; the lowest in Austria where only 12% were strongly in favour (Cauzard, 2004).

2. Factors influencing implementation

2.1. Implementation of offender programmes

Major socio-economic benefits may be associated with the implementation of alcolock programmes for drink driving offenders, mainly resulting from a significant decrease of recidivism. Re-offence rates of alcolock users are 40-90% lower than those of offenders with a suspended licence (Bax et al., 2001). In Sweden, the beneficial effects of alcolocks on drink driving went together with reduced accident and hospitalisation rates (Bjerre, 2005). Despite these benefits, alcolock programmes for drink driving offenders are not yet widespread in Europe.

In most EU countries, legal barriers prevent the implementation of alcolock programmes for offenders without a preceding amendment of traffic laws (Bax et al., 2001). Amendments of the law are generally not possible without awareness and social acceptance of effective drink driving countermeasures among policy makers, practitioners and the general public. At a Transportation Research Board symposium on implementing impaired driving countermeasures, held in 2003, both researchers and policy makers agreed there is often a knowledge gap between these two parties. One important reason for this is a frequent lack of brief, easy-to-understand summaries of research findings (Steward, 2005). Discussions at the symposium pointed out the need for intermediaries who can 'translate' research findings into clear guidance for policy and practice. Active opposition fuelled by economic interests of the alcohol industry was also viewed as a barrier to the implementation of certain types of drink driving countermeasures, like increased alcohol taxes. Alcolock programmes, however, do not directly affect the economic interests of the alcohol industry and may even be supported by this interest group, as is already the case with regard to the "Euro Bob" designated driver campaign (IBSR, 2002). In fact, a recent position paper by The Brewers of Europe (2005) supports the development of alcolock programmes for drink driving offenders and for professional drivers. The paper was published in the members-only area of the brewers' website, which cannot be accessed by the general public.

In an attempt to explain the relatively low number of US states that implemented alcolock programmes, Rauch et al. (2002) investigated legal barriers to alcolock implementation in 49 US states and the District of Columbia. Contrary to most EU-countries, no significant legal barriers were identified in the USA; in many states, legal provisions even supported alcolock implementation. In a contributory paper to the aforementioned Transportation Research Board symposium, Beirness (2005) discussed other than legal barriers to large-scale implementation of alcolock programmes. Apart from a knowledge gap between researchers on the one hand and policy makers and administrators on the other hand, these barriers included:

- Increased recidivism rates after alcolock removal from the vehicle.
- Commercial interest of alcolock vendors, which is viewed with suspicion.
- The traditional focus by the criminal justice system on punishment rather than incapacitation and rehabilitation.

Allo (2000) described why alcolock implementation for offenders in Sweden was delayed. As early as 1992, implementation of an alcolock pilot programme seemed to be feasible already at very short notice. But due to a change of government, in 1994, the preparations had to start all over again since most people involved in the programme were no longer in the government. It lasted until spring 1998 before parliament enacted legislation to permit a 5-year pilot programme, which started February 1999. Allo did not describe how the Swedish government was persuaded to implement alcolocks.

Schonfeld & Sheehan (2004) summarized the most serious reasons why alcolock implementation in Australia was delayed. From these reasons can be derived which factors influence the acceptance of alcolock programmes by the government and the judicial system. These factors comprise:

- (Proven) effectiveness in reducing DUI-recidivism and awareness of it with the community and magistrates.
- The absolute and relative (to income) cost of alcolock programmes to participants;
- Practical issues regarding maintenance, monitoring and enforcement.

2.2. Implementation of commercial programmes

In Sweden, not only an offender programme has been implemented, but also a commercial one. The programme was introduced late 1999, as an aspect of quality assurance in commercial transport. Implementation started with a small-scale demonstration project in partnership with a bus, taxi and truck company and was funded by the Swedish National Road Administration Vägverket. At an early stage, the companies involved started discussions with the employee representatives of the Swedish Transport Workers Union. The start of the project was accompanied by a press conference that got broad positive coverage. In order to minimize discomfort to the drivers and the risk of economic loss to the fleet owners, the alcolocks were programmed for 30 minutes stall protection, allowing to restart the vehicle motor without providing a breath test. Furthermore, the alcolocks had a function that allowed the ignition to be on without the motor being running (for heating purposes, among other things), as well as a reset function for driver changes within the aforementioned 30-minute grace period. And finally, the commercial alcolocks did not have a running retest function. One hundred vehicles of each company were alcolock-equipped. A first evaluation of attitudes among drivers, employers, customers and passengers showed that the alcolock was widely accepted as the best alternative to reduce drink driving (Lönegren, 2003). This is remarkable, since Lönegren & Jakobsson (2004) reported that there was a lot of mistrust in the beginning, due to technical problems with the devices and mistakes with regard to the servicing infrastructure. Furthermore, they reported the following results of the first evaluation, Spring 2000:

- One third of the drivers and employers involved reported that the alcolocks did not function as expected.
- Half of the drivers and two out of five employers thought that alcolocks could be manipulated.
- Drivers were concerned about failed tests as a result of substances other than beverage (ethyl) alcohol.

- Drivers said that alcolocks were an extra source of inconvenience to their work and that alcolock installation in their cars could be regarded as an expression of mistrust from the side of the company and the public.

The results of the second evaluation, summer 2001, were a lot more positive:

- Three out of four drivers responded that alcolocks did not interfere in a negative way with their role as driver.
- More than half of the drivers responded that the alcolocks could even give them a higher status.
- Although not all technical problems were solved, the drivers were worrying less about failures.

A third and last evaluation was conducted late 2002, at the end of the trial. By then, nearly everyone was convinced that alcolocks are the best way to avoid drink driving. The drivers no longer felt that alcolocks interfered in a negative way with their role as a driver, notwithstanding the long warming-up period in wintertime. By the end of 2004, approximately 4000 vehicles had alcolocks installed.

Lönegren and Jakobsson emphasize that the government should not interfere with the implementation of commercial alcolock programmes, except by providing information and apparently in the beginning financial incentives as well.

Although commercial alcolock use was introduced in Sweden as an aspect of quality assurance, the accident-reducing potential was evaluated, too. Among a sample of 538 alcolock-installed taxis, busses, and passenger cars, Bjerre (2005) found 848 positive breath tests (BAC above 0.2 g/l) in more than 250,000 starts. Assumed that each positive test result belonged to a different start, the alcolock prevented 0.34% of all trips from being conducted by an alcohol-positive driver; and 0.04% by a driver with a BAC above 1.0 g/l. (In general, after a failed test, a driver will perform re-tests until he succeeds in starting the car. Bjerre does not explicitly state, whether he was able to filter out the failed re-tests).

3. Factors influencing acceptance and participation

The strongest incentive for participating in an alcolock programme is probably the possibility of a drink driving offender to keep the driver's licence, albeit a restricted one. The loss of one's driver's licence may result in the loss of his or her job. This incentive will be compromised, however, by a preceding period of hard suspension (Beirness, 2001). But there are several other factors that influence participation in a negative way.

In California, a judicial alcolock programme was introduced as early as 1986. It was extensively evaluated by the Evaluation Management Training Group (EMT Group, 1990). Alcolock installation was an optional condition of probation for convicted DUI offenders, to be imposed at the discretion of the judges. Only a small number of judges made use of this option, due to resistance to the alcolock itself and to the additional monitoring responsibility. Judges who did use the alcolock option, only did it for offenders who could afford it, thus ignoring existing provisions concerning economic indigence. However, judges assigned alcolocks to probationers with revoked or suspended licences. One fourth of the offenders who were sentenced to alcolock, never installed it.

A more recent evaluation of the Californian alcolock programme by DeYoung (2002) found that judges still ordered alcolocks for only a fraction (10%) of eligible drivers and that a majority (78%) of the offenders who were ordered to install an alcolock did not do so. The main reasons stated by judges for not ordering alcolocks were:

- One third of the judges did not believe that alcolocks work.
- Many offenders are unable to pay for an alcolock.
- Many offenders have no vehicle.
- Monitoring of offenders is time-consuming.

DeYoung concluded that a way will have to be found to fund alcolocks for indigent offenders. Unlike the EMT Group (1990), DeYoung did not mention existing funds. He also concluded that a solution had to be found for offenders who do not own a car, and that monitoring had to be restructured. But he did not recommend any specific actions. The only specific recommendation was to apply tougher sanctions, "so that there will be more incentives for offenders who comply with an order to install an interlock".

In spite of the high support level for alcolocks in Sweden mentioned in the previous section, the participation rate of the voluntary administrative programme was rather low, even though participation prevented unconditional licence revocation. During the first 20 months of the Swedish trial, only 11% of eligible offenders applied for participation. The reasons for non-participation have not been investigated thoroughly, but the high cost (SEK 40,000-50,000 or € 4,400-5,500) may have been an important obstacle to participation, although Bjerre & Laurell (2000) reported that 40% of eligible offenders were not interested even if the programme was offered at no cost. In addition to the high cost, the inconvenience of 3-monthly medical checks including blood testing may also have played a deterring role (Bjerre & Bergman, 2004). Another factor that negatively influences the Swedish participation rate, and the effectiveness of the programme, is the fact that

after 12 months participants have to demonstrate a sober lifestyle. If biological markers show increased alcohol levels, participants are dismissed from the programme, even if they have not been re-arrested for drink driving and/or have not circumvented the alcolock system. After dismissal, these drivers showed much higher re-offence rates than drivers who had completed the programme, and even than a control group. A similar trend was observed with regard to their involvement in injury crashes (Bjerre, 2005).

Based on the results of a workshop held in Montreal, in 2000, Beirness (2001) summarized factors influencing participation rates. A distinction was made between mandatory and voluntary alcolock programmes, and between judicial and administrative programmes. In mandatory programmes, participation is a condition of licence reinstatement; in voluntary programmes, participation typically results in a shortening of the hard suspension period. Judicial programmes are operated under the authority of the courts; administrative programmes are operated by the licensing authority.

Regarding *mandatory* judicial programmes, to be ordered at the discretion of the courts, the following factors influencing participation in a negative way were listed:

1. Lack of adequate and accurate information about alcolock programmes and their effectiveness among judges and magistrates, resulting in reluctance to order alcolock programme participation.
2. Personal considerations introduced by the offender during the trial, like financial circumstances or lack of vehicle ownership.
3. Violation of court orders, facilitated by a lack of communication between the service provider, probation officers and the courts.

Low participation rates in *voluntary* judicial programmes, resulting in a reduction of the hard suspension period, were explained by the low risk of detection for driving while suspended. The inconveniences and cost associated with participating in an alcolock programme seemed to outweigh the (low) risk of apprehension.

In order to raise participation rates, Beirness recommends that participation in an alcolock programme should be compulsory for all drink driving offenders as a condition of licence reinstatement, and that these programmes should be administered by the licensing authorities.

Beirness also reports that judicial alcolock programmes can have much higher participation rates if incarceration or electronically monitored house arrest are the only alternatives. This finding results from a pilot study by Voas et al. (2002). The objective of this study was to determine whether more severe sanction alternatives to installing an alcolock, as applied by one US county court, would result in higher participation rates. The 62% participation rate was significantly higher than the 10% or lower rates generally achieved by other courts or US motor vehicle departments. However, this finding seems to be of limited value for EU countries, since the sanction of imprisonment is imposed only to a very small proportion of drink driving offenders, mainly consisting of high BAC drivers who caused a serious-injury or fatal crash. It is not likely that public prosecutors and judges in EU countries will consider mandatory alcolock programme participation as

a reasonable alternative sanction for those offenders. Furthermore, it is not likely either that legislators and courts in EU countries will be prepared to impose much harsher penalties for drink driving than the current ones, just for the sake of increasing alcolock programme participation rates. Introducing much harsher penalties for drink driving would probably imply that the whole system of crime sanctioning would have to be revised.

An ICADTS Working Group on Alcohol Ignition Interlocks (2001), which identified several factors influencing alcolock programme participation, seemed to be sceptical, too, about the possibilities of introducing imprisonment or house arrest as the only alternatives, stating, "Hancock County may be the only jurisdiction with such a strict interlock policy." Instead of harsher punishment, the working group recommended research aiming at the evaluation of the effects of alcolock installation immediately after a drink driving offence, and not preceded by a period of hard suspension. Against the sometimes cited cost of leasing an alcolock as a reason for low participation rates in North America, the working group argued that the cost of alcohol use by offenders probably exceeds the cost of an alcolock programme, which was approximately \$65 a month at the time. Furthermore, in most jurisdictions funds were available to support the really poor.

It may be hypothesized that participation rates are generally higher in mandatory alcolock programmes than in voluntary ones, but that compliance is higher in the voluntary programmes. Beirness et al. (2002) were able to test the last hypothesis in Alberta, Canada, where both programme types were implemented. Neither during nor after alcolock installation they found differences in repeat drink driving offences between participants of the voluntary and mandatory programmes. Unfortunately, the researchers were not able to assess the participation rate of the mandatory programme. Nevertheless they concluded that "Programme administrators can have confidence that increased use of mandatory participation in interlock programmes will not have a detrimental effect on the overall success of the programme".

The distinction between mandatory and voluntary programmes, however, seems to be of less importance with regard to participation rates than the type of programme administrator: judicial versus licensing authority. This may be concluded from the results of evaluation studies of voluntary alcolock programmes in Quebec and Illinois.

In Quebec, a voluntary administrative programme has been in place since 1997. The programme is administered by the Société de l'Assurance Automobile du Québec (SAAQ), which issues the restricted licence needed to have an alcolock installed. The incentive to participate in the programme is a reduction of the licence suspension period. During the first year of implementation, 20% of Driving While Impaired (DWI) suspended drivers participated in the alcolock programme. The actual participation rate among eligible DWI offenders was even higher, because after the first half-year an amendment to drink driving legislation rendered second offenders ineligible (Dussault & Gendreau, 2000). (This was subsequently changed to once again allow participation by repeat offenders.)

Frank et al. (2002) evaluated the Illinois alcolock programme, which was implemented in 1994. It is a voluntary administrative programme, resulting in a reduction of the licence suspension period for (essentially multiple) offenders. During the first three years after implementation of the programme, approx. 30% of eligible drivers applied for participation. This percentage is about three times as high as the typical 10% or lower participation rate reported by Beirness (2001). Nevertheless, the researchers state that the group of Illinois programme participants "represents only a fraction of the potentially eligible drivers". The cost of installation and monitoring, among others, is mentioned as a barrier to higher participation rates.

In a contributory paper to the 16th International Conference on Alcohol, Drugs and Traffic Safety, Beirness & Robertson (2002) emphasized that as many drink driving offenders as possible should be eligible for alcolock programme participation. Especially offenders deemed most at risk for recidivism should not be systematically excluded from participation. The authors suggest that participation rates might also increase if programme participation was not preceded by a (lengthy) period of hard suspension.

Although not explicitly mentioned in the reviewed literature on alcolocks, the level of police enforcement of drink driving laws may strongly influence participation in mandatory programmes. At a low enforcement level, programme participants who have been drinking may be tempted to drive a non-alcolock installed car or let a bystander or passenger perform the breath test. A time series of roadside surveys in the Netherlands covering a 30-year period showed a high correlation between enforcement and drink driving levels. During the whole period, each doubling of the enforcement level resulted in a substantial reduction (by approx. 25%) of drink driving (Mathijssen, 2004).

The Swedish *commercial* alcolock programme has been quite successful in raising participation rates. Four years after the introduction, approx. 4000 commercial vehicles had an alcolock installed. A small-scale demonstration project subsidized and evaluated by the government, enhanced awareness not only among fleet owners but also among the clients of transport companies and the automotive industry (Lönegren & Jakobsson, 2004). Bjerre (2005) reports that, 3 years after the start of the project, "most of the drivers viewed the alcolock as a natural part of their driving routine despite the fact that about half of them had experienced technical problems".

Regan et al. (2002) assessed the acceptability of various in-vehicle ITS technologies, including alcolocks to a sample of 52 drivers in Victoria, Australia. Subjects were recruited through a random number telephone survey. Results of the study were based on self-reporting during group discussions, which were preceded by a functional description of the system and a short video presentation. Participants viewed alcolocks as unacceptable because they believed it would be too irritating to do a breath test before starting the car.

In New South Wales, Australia, a similar study was conducted among a sample of 58 young male novice drivers. This study produced less negative results; the key findings regarding acceptability of alcolock systems were (Young et al., 2003):

- It should be possible to engage and disengage the alcolock at will.
- The system should have a low false alarm rate.
- Engine immobilisation during driving was viewed as dangerous and unacceptable.
- The system should be ergonomically designed.
- An alcolock should be compulsory, particularly for recidivists (which seems to be contradictory to the demand that it should be possible to disengage the alcolock at will).
- The cost participants were willing to pay, varied between \$ 100 and \$ 500.

4. Factors influencing compliance

In order to prevent programme violations, Beirness (2001) recommended regular monitoring, at least monthly. If monitoring is combined with objective assessments and counselling, it might also be possible to determine participants' risk of recidivism after alcolock removal from the vehicle.

In Sweden, however, where regular monitoring and medical assessments are an integrated part of the offender programme, compliance with the programme conditions was not very high: nearly 40% of the original number of participants were at any moment expelled from the programme. Some others decided to leave the programme voluntarily. The high dropout rate in Sweden may be explained by the fact that, before programme participation, 47% of participants were diagnosed as being alcohol dependent and another 13% as being alcohol abusers, according to DSM-IV (Bjerre & Bergman, 2004).

Marques et al. (2000) studied compliance with drink driving legislation after the ending of the programme and removal of the alcolock from the vehicle. First offenders who had undergone an adjunctive motivational intervention were compared with first offenders who had not. The intervention consisted of various programme elements designed to educate and raise awareness of the need to plan vehicle use whenever any drinking may be possible. During the first 12 months after alcolock removal, the intervention group had about half the number of repeat DUI offences when compared to the non-intervention group. The difference was not statistically significant, however, due to the low re-offence rates. Furthermore, the impact of the effect did not extend beyond the 12-month period after alcolock removal, and no intervention effect was found among multiple offenders. Part of the weak impact was attributed to the lack of programme structure. Therefore, a new study was undertaken in which the intervention programme was tightly controlled (Marques et al., 2004). The programme, known as SIP (Support for Interlock Planning), was built among personal change readiness and motivational enhancement theory. The programme is still underway, in Texas, but preliminary outcome data suggests a beneficial intervention effect.

In order to tackle the problem of increased recidivism rates after alcolock removal, Beirness (2001) recommends flexible programme duration, based on frequency and/or seriousness of alcolock fails during the programme (also see: Marques et al., 2001). The ICADTS Working Group on Alcohol Ignition Interlocks (2001) recommended evaluation of such flexible programme duration. Furthermore, the working group recommended to use biological markers like CDT (Carbohydrate Deficiency Transferrin) as additional objective criteria for determining the programme duration.

Finally, as in participation, the level of drink driving enforcement by the police may play an important role in compliance with alcolock programme conditions as well.

5. Summary and discussion of results

A condition for the *implementation* of drink driving countermeasures is a sufficient amount of social acceptance, especially if an amendment of traffic laws is required. Researchers can contribute to that by bridging the knowledge gap with policy makers, practitioners and the general public. A first step is the availability of brief, easy-to-understand summaries of research findings. In the case of alcolock implementation, a problem may be that researchers use many different terms for the devices and the programmes, some of them being quasi-scientific and/or needlessly unclear to the general public. A short anthology of terms used by researchers:

- breath alcohol ignition interlock device
- alcohol safety interlock
- alcohol ignition interlock (programme)
- ignition interlock (programme)
- interlock device
- interlock (programme)
- ignition interlock licence restriction (programme).

Another problem concerns content, and especially the effectiveness of alcolocks in preventing (repeat) drink driving. Increased recidivism after alcolock removal from the vehicle was identified as one of the main reasons why policy makers may have their doubts about effectiveness. These doubts may also be fuelled by the fact that nearly all evaluation studies conducted so far suffer from selection bias. It seems imperative that these problems are addressed in a convincing way when disseminating research findings to policy makers, magistrates and the general public.

Policy makers also worry about the cost of alcolock programmes to participants. Most of these costs do not result, however, from alcolock installation and maintenance, but from monitoring, counselling and medical assessments. By distinguishing different target groups based on the seriousness of the drink driving offence, and by making use of data from the alcolock's data recorder, tailored programmes can be developed, generating relatively low costs to drivers with minor drink driving problems and relatively high costs to drivers with major problems (like alcohol-dependent drivers).

A last problem is related to opposition by interest groups. In the case of alcolocks, probably no opposition has to be expected from the alcoholic beverages industry, since its economic interest is not directly affected by the implementation of alcolock programmes. Maybe the industry will even support alcolock implementation, when asked. In the United States and Canada, some opposition was felt from the criminal justice system, whose traditional focus is on punishment rather than on incapacitation and rehabilitation. Long periods of licence suspension ordered by the courts may endanger alcolock programme participation, especially by serious offenders. It is therefore important to clearly demonstrate that alcolocks are far more effective in preventing repeat drink driving than licence suspension or revocation.

Commercial alcolock programmes seem to be easier to implement than *offender* programmes. In Sweden, after the introduction of a small-scale demonstration project subsidized by the government, implementation was successfully left to market parties consisting of transport companies, their clients and alcolock vendors. In order to convince transport companies to install alcolocks, it is important that they and their clients consider alcolocks as a tool for quality assurance. Furthermore, discomfort to the drivers and the risk of economic loss to the fleet owners should and can be minimized by programming the alcolock's software accordingly. Other essential activities preceding and accompanying commercial alcolock implementation are: publicity aimed at raising awareness; early discussions between public and private parties and interest groups (like trade unions); information to actual alcolock users and their social environment.

An evaluation of the accident-reducing potential revealed that commercial alcolocks in Sweden prevented 0.34% of all trips from being conducted by an alcohol-positive driver (BAC above 0.2 g/l); and 0.04% by a driver with a BAC above 1.0 g/l.

The most important factors influencing *participation* in offender programmes that could be derived from the literature are the following:

- the type of programme: voluntary versus mandatory;
- the type of programme administrator: judicial authority versus licensing authority;
- the cost of programme participation.

In *mandatory* alcolock programmes, participation is a condition of licence reinstatement; in *voluntary* programmes, participation results in a shortening of the hard suspension period. The literature provided no evidence for hypothesized higher participation rates in mandatory programmes.

Nevertheless, it seems logical that alcolock programme participation is more attractive if full licence reinstatement is dependent on successful completion of an alcolock programme than if the licence is suspended or revoked for a relatively short period. Although not explicitly mentioned in the reviewed literature on alcolocks, the level of police enforcement of drink driving laws may strongly influence participation in mandatory programmes. At a low enforcement level, programme participants who have been drinking may be tempted to drive a non-alcolock installed car or let a bystander or passenger perform the breath test.

Participation rates are also influenced by the type of programme administrator: *judicial* authority versus *licensing* authority. The most extensively evaluated judicial alcolock programme is probably the Californian one. This programme suffers from low participation rates, which were explained by:

- Lack of adequate and accurate information about alcolock programmes and their effectiveness among judges and magistrates, resulting in reluctance to order programme participation. In the late 1980s, one third of the judges did not believe that alcolocks work; around 2000, only 10% of eligible drivers were ordered to install an alcolock.
- Resistance of judges to the monitoring responsibility.
- Financial circumstances of the offenders and/or lack of vehicle ownership.

- Violation of court orders, facilitated by a lack of communication between the service provider, probation officers and the courts. During the late 1980s, a quarter of the offenders who were alcohollock sentenced, never installed it. Around 2000, the share of court order violations in California had grown to no less than 78%.

Evaluation studies of two US voluntary alcohollock programmes administered by *licensing authorities* found significantly higher participation rates. In one programme, 20% of eligible offenders participated in the programme; in the other, 30% of eligible drivers applied for participation. Administrative programmes do not suffer from (most of) the negative factors of influence associated with judicial programmes.

The low participation rate (11%) of the voluntary Swedish offender programme, which is also administered by the licensing authority, may be explained by the extremely high cost of the programme when compared to US and Canadian programmes. The cost to Swedish participants is at least twice as high, mainly as a result of 3-monthly medical checks. These checks are necessary, since not only first and repeat offenders are eligible, but also alcohol-dependent drivers. Swedish researchers reported that 40% of eligible drivers were not interested even if the programme was offered at no cost, but that does not seem to be sufficient evidence that the cost factor does not play an important role with regard to participation.

Compliance with alcohollock programme rules is mainly dependent on the frequency of monitoring, according to the literature. Recommended monitoring intervals do not exceed one month. In alcohollock programmes for alcohol-dependent drivers, to date only applied in Sweden, monitoring should comprise regular medical assessments. And, finally, although again not explicitly mentioned in the reviewed literature, the level of drink driving enforcement by the police may play an important role. In order to tackle the problem of increased recidivism rates after alcohollock removal, a flexible programme duration is recommended, based on monitoring results during the programme. In theory, this option would make it possible to indefinitely extend the period of programme participation for drivers who cannot separate drinking from driving without the help of an alcohollock. Integrated counselling built around personal change readiness and motivational enhancement theory, may also have a beneficial influence on recidivism after alcohollock removal, although evidence is not yet delivered.

Based on evidential and hypothetical findings from the literature, the 'ideal' alcohollock programme for drink driving offenders would be:

- mandatory (successful completion of the programme being a condition of full licence reinstatement);
- open to alcohol-dependent drivers, even if they don't show a sober lifestyle after a certain period of programme participation (on the condition that they do not re-offend and/or circumvent the alcohollock system);
- *not* preceded by a (lengthy) period of hard suspension;
- administered by licensing authorities, without preventing courts from ordering programme participation (e.g. as an alternative to hard suspension);
- recorded on the driver's licence (in order to facilitate police enforcement);

- tailored to distinctive target groups, based on objective criteria (in order to reach an optimal cost/benefit ratio);
- regularly monitored (for all target groups);
- combined with counselling (for serious offenders);
- combined with counselling and regular medical assessments (for alcohol-dependent drivers);
- flexible in duration, based on monitoring and assessment results; by prolonging the programme period for drivers with an unsolved drinking problem, ineffective licence revocation can be prevented;
- supported by funds for indigent offenders.

References

- Allo, B. (2000). *Ignition Interlocks in Sweden*. In: Proceedings of the 15th International Conference on Alcohol, Drugs and Traffic Safety T2000, Stockholm.
- Bax, C. (ed.), Kärki, O., Evers, C., Bernhoft, I.M. & Mathijssen, R. (2001). *Alcohol interlock implementation in the European Union; Feasibility study*. D-2001-20. SWOV Institute for Road Safety Research, Leidschendam.
- Beirness, D.J. (2001). *Best practices for alcohol interlock programs*. Traffic Injury Research Foundation, Ottawa.
- Beirness, D.J. (2005). *Challenges to ignition interlock program implementation*. In: Spellman, P. & Gawel, J.E. (eds). *Implementing Impaired Driving Countermeasures; Putting Research into Action*. A Symposium, August 21-23, 2003, Irvine, California. Transportation Research Circular Number E-C072. Transportation Research Board, Washington, DC, p. 73-86.
- Beirness, D.J., Marques, P.R., Voas, R.B. & Tippetts, A.S. (2002). *The impact of mandatory versus voluntary participation in the Alberta ignition interlock program*. In: *Traffic Injury Prevention*, vol. 4, p. 195-198.
- Beirness, D.J. & Robertson, R.D. (2002). *Best practices for alcohol interlock programs: Findings from two workshops*. In: Proceedings of the 16th International Conference on Alcohol, Drugs and Traffic Safety T2002, Montreal.
- Bjerre, B. (2005). *Primary and secondary prevention of drink driving by the use of alcohol device and program: Swedish experience*. In: *Accident Analysis and Prevention* vol. 37, p. 1145-1152.
- Bjerre, B. & Bergman, H. (2004). *The Swedish ignition interlock programme; Is it possible to forecast which DWI offenders will succeed in the programme and which will not?* In: Proceedings of the 17th International Conference on Alcohol, Drugs and Traffic Safety T2004, Glasgow.
- Bjerre, B. & Laurell, H. (2000). *The Swedish alcohol ignition interlock programme*. In: Proceedings of the 15th International Conference on Alcohol, Drugs and Traffic Safety T2000, Stockholm.
- Cauzard, J.-P. (ed.) (2004). *European drivers and road risk : Project on Social Attitudes to Road Traffic Risk in Europe SARTRE 3. Part 1: report on principal analyses*. Institut National de Recherche sur les Transports et leur Sécurité INRETS, Arceuil.
- DeYoung, D.J. (2002). *An evaluation of the implementation of ignition interlock in California*. In: *Journal of Safety Research*, vol. 33, p. 473-482.

Dussault, C. & Gendreau, M. (2000). *Alcohol ignition interlock: One-year's experience in Québec*. In: Proceedings of the 15th International Conference on Alcohol, Drugs and Traffic Safety T2000, Stockholm.

EMT Group (1990). *Evaluation of the California Ignition Interlock Pilot Program for DUI Offenders (Farr-Davis Driver Safety Act of 1986); Final report*. EMT Group, Inc., Sacramento.

Frank, J.F., Raub, R., Lucke, R.E. & Wark, R.I. (2002). *Illinois ignition interlock evaluation*. In: Proceedings of the 16th International Conference on Alcohol, Drugs and Traffic Safety T2002, Montreal.

IBSR (2002). *"Euro Bob" European designated driver campaign against drinking and driving 2001-2002. Final report*. IBSR/BIVV Belgian Road Safety Institute, Brussels.

ICADTS Working Group on Alcohol Ignition Interlocks (2001). *Alcohol Ignition Interlock Devices; I: Position paper*. International Council on Alcohol, Drugs and Traffic Safety.

Lönegren, B. (2003). *How to achieve drug-free driving? In: Safe and sustainable transport: a matter of quality assurance*. OECD, Paris: p. 101-103.

Lönegren, B. & Jakobsson, L. (2004). *Alcohol ignition interlocks in commercial traffic*. Personal communication.

Marques, P.R., Tippets, A.S., Voas, R.B., Danseco, E.R. & Beirness, D.R. (2000). *Support services provided during interlock usage and post-interlock repeat DUI: Outcomes and processes*. Proceedings of the 15th International Conference on Alcohol, Drugs and Traffic Safety T2000, Stockholm.

Marques, P.R., Tippets, A.S., Voas, R.B., Danseco, E.R. & Beirness, D.R. (2001). *Predicting DUI offenses with the alcohol interlock recorder*. Accident Analysis and Prevention 33: 609-619.

Marques, P.R., Voas, R.B. & Timken, D.S. (2004). *Preliminary outcomes from a Texas manual-based group motivational intervention supplement for court-stipulated interlock DUI offenders*. Proceedings of the 17th International Conference on Alcohol, Drugs and Traffic Safety T2004, Glasgow.

Mathijssen, M.P.M. (2004). *Three decades of drink driving policy in the Netherlands; An evaluation*. Proceedings of the 17th International Conference on Alcohol, Drugs and Traffic Safety T2004, Glasgow.

Rauch, W.J., Berlin, M.M., Ahlin, E.M. & Berlin, P.A. (2002). *Ignition interlock laws and administrative regulations: do legal constraints prevent implementation of ignition interlock license restriction programs in the United States?* In: Proceedings of the 16th International Conference on Alcohol, Drugs and Traffic Safety T2002, Montreal.

Regan, M.A., Mitsopoulos, E., Haworth, N. & Young, K. (2003). *Acceptability of in-vehicle intelligent transport systems to Victorian car drivers*. Monash University Accident Research Centre, Clayton, Victoria.

Schonfeld, C.C. & Sheehan, M.C. (2004). *Critical overview of alcohol ignition interlock programs in Australia*. In: Proceedings of the 17th International Conference on Alcohol, Drugs and Traffic Safety T2004, Glasgow.

Silverans, P., Alvarez, J., Assum, T., Evers, C. Hagman, R. & Mathijssen, R. (2006). *Alcolock implementation in the European Union. Description, results and discussion of the alcolock field trial. Final report*. BIVV/IBSR Belgian Road Safety Institute, Brussels.

Steward, K.G. (2005). *Foreword*. In: Spellman, P. & Gawel, J.E. (eds). *Implementing Impaired Driving Countermeasures; Putting Research into Action*. A Symposium, August 21-23, 2003, Irvine, California. Transportation Research Circular Number E-C072. Transportation Research Board, Washington, DC, p. 1-6.

The Brewers of Europe (2005). *Position on ignition interlock devices*. www.brewersofeurope.org (members only area).

Voas, R.B., Blackman, K.O., Tippetts, A.C. & Marques, P.R. (2002). *Evaluation of a program to motivate impaired driving offenders to install ignition interlocks*. In: *Accident Analysis and Prevention*, vol. 34, p. 449-455.

Young, K.L., Regan, M.A., Mitsopoulos, E. & Haworth, N. (2003). *Acceptability of in-vehicle intelligent transport systems to young novice drivers in New South Wales*. Monash University Accident Research Centre, Clayton, Victoria.