Alcohol Interlock Implementation in the European Union; Feasibility study

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Alcohol Interlock Implementation in the European Union; Feasibility study

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Partners:
BASt, Bundesanstalt für Straßenwesen, Germany
DTF, Danish Transport Research Institute
VTT Building and Transport, Finland

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EXECUTIVE SUMMARY

René Mathijssen (SWOV), Otto Kärki (VTT), Claudia Evers (BASt), Inger Marie Bernhoft (DTF), Charlotte Bax (SWOV, ed.).

From 1 November 2000 until 1 September 2001, a consortium of European road safety research institutes conducted a feasibility study regarding the implementation of Breath Alcohol Ignition Interlock Devices (BAIIDs) in EU drink-driving policies. A BAIID is a breath testing device connected to the ignition system of a motor vehicle. It prevents an operator from starting the vehicle if the breath alcohol concentration (BrAC) exceeds a predetermined threshold or fail level. The use of BAIIDs is embedded in a program of monitoring and servicing, sometimes complemented with medical and/or psychological interventions.

In more detail, the goals of the study were:
- to investigate the effects of BAIID use on drink-driving and road safety;
- to identify target groups for BAIID programme participation;
- to make an inventory of the requirements BAIIDs and programmes should meet;
- to design an EU field trial;
- to identify EU countries which are willing and able to introduce BAIID programmes.

The effects of BAIID programmes on drink-driving and road safety
Over the last 15 years several American and Canadian BAIID programmes for DUI (driving under the influence) offenders have been evaluated. Despite huge differences among the programmes, the target groups and the accompanying evaluation studies, study results indicate that BAIIDs effectively prevent drink-driving during the period of BAIID installation. Most studies, however, give proof of methodological inadequacies which make the results less conclusive. In only one study, in Maryland, multiple DUI offenders were randomly assigned to the experimental or the control group. Preliminary results indicated that, within the first year of BAIID programme participation, DUI recidivism was reduced by about 65% (Beck et al., 1999).

According to most studies, after BAIID removal from the vehicle recidivism rates appeared to increase again. No residual effect in preventing impaired driving could be observed. An exception is preliminary data from a BAIID programme in Quebec, which started in 1997. The study design was that of a before-during-after comparison. No control group was included in the study. During the period of BAIID installation, the DUI recidivism rate dropped by more than 90%. In a six-month period following removal of the BAIID, the recidivism rate did not increase. Furthermore, traffic offence and crash figures showed a significant decrease during both the BAIID- and after-periods (Dussault & Gendreau, 2000).

Preliminary results from a study in Calgary and Edmonton (Alberta, Canada) suggest that the incorporation of rehabilitation ('harm-reducing intervention') in the BAIID programme has positive effects on recidivism rates after the BAIID period. This finding, however, was not statistically significant. The rehabilitation programme was designed to educate and raise awareness among participants of the need to plan and re-evaluate their vehicle use whenever alcohol consumption was likely to occur. The participants met with a case manager every time the BAIID needed servicing.
Furthermore, statistical analysis showed that programme participants with high failure rates during the BAIID period were 2-3 times more likely to commit a re-offence after the BAIID period. This result suggests that participants with high failure rates should be required to have an interlock for an extended period (Marques et al., 2000).

The promising results of the American and Canadian evaluation studies justify a large-scale field trial in one or more EU countries.

Target groups for an EU field trial
In the United States, Canada and Australia, targets groups of BAIID programmes were first offenders with very high alcohol concentrations, second offenders and multiple offenders. In Sweden, target groups also include professional drivers and alcohol-dependent drivers.

Due to a great variety in sanctions for driving under the influence of alcohol in the various EU countries, it is not feasible to define one or more target groups for an EU field trial in terms of offender types, like first, second or multiple offenders. A definition in terms of imposed sanctions for DUI seems to be more appropriate. In that case, the definition of target groups could be related to the sanctions of license suspension (imposed by the court) and/or mandatory rehabilitation/driver improvement courses (imposed by the licensing authority). Participation of alcohol-dependent drivers does not seem possible without a change in legislation in the participating countries.
Possible target groups for commercial BAIID programmes are tour operators, (local) bus companies, dangerous goods or heavy freight transport companies, and taxi companies. The actual use of the BAIIDs by the drivers involved should, of course, be compulsory.

The greater the drink-driving problems of the target group are, the greater the beneficial effects on road safety can be. Therefore, DUI offenders seem to be the most appropriate target group for an EU field trial.

EU BAIID programme requirements

Technical requirements
The BAIID will have to meet certain technical requirements. Technical standards have been defined in the USA, Canada and Australia. These standards relate to reliability, accuracy, circumvention and tampering, and electromagnetic interference with the vehicle and vice versa. The most recent and most demanding standards are the Alberta standards, which also apply in Sweden.
In order to minimize the risk of false positive readings, BAIIDs with an electrochemical sensor (fuel cell) are recommended. Key features to prevent circumvention or tampering are: sealed wiring, human breath recognition systems, the inclusion of a data recorder, and random running re-tests.

Ideally, technical requirements should be uniform for all EU countries. Furthermore, they should meet the highest possible technical standards, these for the moment being the Alberta standards. But, on the other hand, very high standards may cause lack of competition between manufacturers, thus increasing the cost of the devices. To date, only one device meets the Alberta standards. The cost of the device may strongly influence a DUI offender's willingness to participate in a BAIID programme. So, in order to stimulate competition, it might be sensible to allow some variation of the technical requirements between EU countries, depending on their topographical and climatic conditions. It does not seem necessary for all EU countries that the devices function accurately up to a height of 3,500 metres or within a temperature range of -45 to +85 °C.

Not all technical requirements, however, are covered by existing standards. In the literature on BAIIDs nothing was found, for instance, on the subject of an emergency bypass switch. Whether BAIIDs should be provided with such a switch, depends on the risk of false positive readings and other kinds of malfunction. During preliminary testing by one of the consortium partners, the connector of the detachable sample head broke down, preventing the car from getting started. Therefore, it seems advisable to install an emergency bypass switch in the vehicles involved in an EU field trial, and to evaluate legitimate and illegitimate use.

Bypassing the BAIID should be considered to be a programme violation, except when the driver can prove force majeure. The bypass switch should allow for single-use, resulting in a compulsory visit to the service provider within a few days. Otherwise, the car should be immobilized.

A primary safety criterion that BAIIDs will have to meet, is that running re-tests can be performed without visual distraction and/or unintended manoeuvring. This implies, among other things, the following technical requirements:

- The sample head has to be mounted in such a way that it can be used and replaced without the driver having to take his eyes off the road or to change his position behind the steering wheel.
- The request for a running re-test and the sampling procedure should only be accompanied by unambiguous auditive signals, and should not interfere with the driving task.

In addition to these requirements, training of all BAIID users in real traffic or in a simulator is recommended.

Implementation procedures

An important item is the setting of a BrAC threshold (fail level) for BAIIDs. The main goal of a BAIID programme should be that participants learn to separate drinking from driving. For that reason, a BrAC threshold of 0.00 mg/l would be preferable. On the other hand, the breath testing device may produce small positive test results, even if a person has not drunk alcoholic beverages. So, for practical reasons and for the sake of legal security, a BrAC-threshold of 0.10 mg/l is recommended. Depending on the national legislation of EU countries, this threshold equals a blood alcohol concentration (BAC) varying from 0.21 to 0.23 g/l.

BAIID programme participation can be administered under criminal law (by the courts) or under administrative law (by the licensing authority). Participants should be monitored regularly, and simultaneously the data from the BAIID data recorder should be reviewed. Monitoring and enforcing a DUI offender's compliance with the BAIID programme requirements demands close co-operation between programme providers, the police and the programme administrative authority (probation or licensing authority).

It is recommended that DUI offenders pay at least part of the cost of BAIID programme participation in order to get a motivated participant group. On the other hand, too high costs may be a barrier for eligible DUI offenders to participate.

Legal requirements and existing provisions in EU countries

A survey of legal requirements and provisions for BAIID programmes was conducted in eleven European countries. Although, apparently, legal aspects had not yet been thoroughly investigated by the respondents, the following essentials could be derived from the survey results:

- BAIID programmes can be integrated in existing sanctions for DUI. They can, for instance, substitute license suspension or shorten the suspension period, or they can be implemented as an accompanying measure as part of rehabilitation/driver improvement courses.
- BAIID programmes can be introduced as a general preventive measure (for all volunteering drivers, for various categories of professional drivers, etc.) or as a specific preventive measure (for DUI offenders).
- BAIID programmes for DUI offenders should, at least partly, be financed by the participants.
- Suggested BrAC thresholds (fail levels) varied from zero to the legal limit.

- Mandatory BAIID programmes are assumed to require changes in legislation, especially in traffic law.
- The predominant opinion of the respondents is that BAIID programmes constitute an effective tool in preventing drink-driving, and a good alternative for license suspension.

Design of an EU field trial for DUI offenders

Target groups
The definition of target groups can be related to the sanctions of license suspension (imposed by the court) and/or mandatory rehabilitation/driver improvement courses (imposed by the licensing authority).

Under criminal law, the following DUI offenders might be target groups for BAIID use:
- DUI offenders who, if the sanction of mandatory BAIID programme participation did not exist, would have only a period of probationary license suspension imposed by the court. For these offenders, the mandatory BAIID use would mean an aggravation of the sanction, which in most EU countries would probably require an amendment of the law.
- DUI offenders who, if the sanction of mandatory BAIID programme participation did not exist, would have a period of hard license suspension imposed by the court. For these offenders, the mandatory BAIID use would mean an alternative sanction: (part of) the hard license suspension period is replaced by a probationary license suspension period, combined with mandatory BAIID use. If the court leaves the choice between hard suspension or participation in a BAIID programme to the discretion of the offenders, the programme is quasi-voluntary. Participation rates will then probably be (much) lower than in the case of fully mandatory participation. At least in some EU countries, participation in a BAIID programme can be imposed without an amendment of the law.

Under administrative law, mandatory BAIID use might be imposed on all drivers who have to follow a rehabilitation/driver improvement course as a condition for license re-instatement. For these drivers, too, the mandatory BAIID use would mean an aggravation of the sanction. In which countries this would require an amendment of the law, has not become very clear from the inventory of legal requirements and possibilities, probably reflecting the fact that these have not yet been considered in detail.

Most desirable versus most realistic target group
The most desirable target group is constituted by drivers who have to follow a rehabilitation course, since the effectiveness of BAIID use will probably be enhanced, if it is combined with rehabilitation. Furthermore, the effectiveness of rehabilitation courses will probably also increase, by combining them with a BAIID programme. There seem to be some major practical problems, though. Some of the drivers who have to follow a rehabilitation course, may have had a period of hard suspension and/or a period of mandatory BAIID use imposed by the court, which might interfere with BAIID use as part of a rehabilitation course.
The most realistic target group for an EU experiment is probably that of DUI offenders who have had a period of mandatory BAIID use imposed by the courts, as an alternative for a period of hard license suspension. If these drivers also have to follow a rehabilitation course (and in some EU countries this will be the case for nearly the entire group), it is recommended to find ways of combining the two.

In order to stimulate BAIID programme participation by DUI offenders, it is recommended to avoid a preceding standard hard suspension period. Firstly, because the offender's financial position might deteriorate dramatically as a result of hard suspension; for commercial drivers it can even constitute grounds for dismissal. And secondly, because a suspended DUI offender might still drive a car and perceive a very low risk of apprehension. In both instances, the cost of BAIID use might exceed the perceived benefit. This may especially be important, if an offender is given the choice between a period of hard suspension or entering

a BAIID programme. Therefore, preceding hard suspension periods should preferably be restricted to very serious DUI cases.

Duration of an experimental BAIID programme
The period of BAIID use to be imposed by the court, might be linked to the period of probationary license suspension that it is combined with, for instance:

- As an alternative for 3 months of hard suspension: 6 months of probationary suspension in combination with 18 months of BAIID use.
- As an alternative for 12 months of hard suspension: 3 months of hard suspension + 12 months of probationary suspension in combination with 24 months of BAIID use.

The prolonged periods of probationary license suspension in the case of BAIID programme participation might give in to objections from some EU countries against replacing or mitigating the existing sanction of hard license suspension.

If BAIID programmes become an integrated part of rehabilitation courses under administrative law, they can probably be better tailored to individual participants. Also, pre-conviction programme participation would be possible. A practical problem, however, would occur if, in a later stage, the court imposed a period of hard suspension.

Evaluation of an EU BAIID experiment
The design of an experimental BAIID programme for DUI offenders should be aimed at evaluating the effects on DUI recidivism and, if possible, accident rates. Based on the results of the latter evaluation, a cost-effectiveness analysis could be made.

The experimental group might consist of DUI offenders who have had a BAIID programme imposed or offered by the courts, as an alternative for hard license suspension. An important advantage of taking this entire group instead of the subgroup that is actually participating in a BAIID programme, is that the problem of self-selection is avoided.
The control group should then consist of DUI offenders who have had a hard suspension period imposed. Random assignment to experimental or control groups would be ideal, but is probably not feasible since it would create a high degree of legal inequality between equal offenders.
If random assignment is not possible, the control group might be found in an area where the alternative of BAIID programme participation is not available. In that case, it is important that the control group comes under the same (national) jurisdiction as the experimental group. Otherwise, both groups may very possibly not be not comparable with respect to the severity of their drink-driving offences and their risk of repeat drink-driving. Furthermore, the risk of apprehension for DUI should be more or less identical for both groups. This so-called 'post-test-only design with equivalent groups' is probably feasible, since the inequality between DUI offenders in the experimental and control area is not of a legal but of a physical nature (namely depending on the availability of a BAIID programme). The design could be strengthened by including a pre-test period. This is possible by collecting data on DUI offences and accident involvement over a period preceding BAIID programme participation or license suspension.

In order to get convincing results for both policy makers and the general public, the experimental group should contain at least 500 actual BAIID programme participants; the control group might contain approximately 1,000 DUI offenders who have had a period of hard license suspension imposed. From a statistical viewpoint, this sample size allows a recidivism reduction of approximately 30% in the experimental group, when compared to the control group, to be significant at a 95% probability level.

Recidivism rates should be compared both during and after treatment in order to assess the long-term effects, preferably by means of survival analysis. This kind of analysis makes it

possible to account for competing hazards, like hospitalisation, death or imprisonment of the drivers involved.

If the experimental group consisted of DUI offenders who are following a mandatory rehabilitation course with integrated BAIID use, the control group would consist of DUI offenders who are only following a mandatory rehabilitation course. On this design the same conditions with respect to comparability of the two groups are applicable as in the design for DUI offenders who have had a BAIID programme imposed or offered by the courts.

Duration of an EU BAIID experiment
The duration of an EU experiment with BAIID use by DUI offenders would be approximately 4½ years:
- inclusion period: ½ year;
- experimental period: 2 years;
- post-experimental period: 1 year;
- data collection, analysis and reporting: 1 year.

If a rehabilitation course is integrated in the BAIID programme, extension of the post-experimental period with one year may be interesting. That is, if the reduction of recidivism during programme participation was significant. In that case, reporting might be split into two parts: after 3½ years on the effect during programme participation, and after 5½ years on the effect after programme participation and BAIID removal from the vehicle.

Feasibility of an EU BAIID experiment
In order to identify countries which are able and willing to undertake a field trial, the research consortium not only conducted the before mentioned survey among road safety experts of various EU countries, but also organized an international workshop on BAIIDs. Representatives of Belgium, France, the United Kingdom, the Netherlands, Spain and Finland expressed their interest in conducting a BAIID field trial, some of them not necessarily in an EU context. Most countries, however, were not yet aware of the details of the required legal, practical and financial arrangements.
Due to the great variety in sanctions for driving under the influence of alcohol in the various EU countries, it would be an advantage if an experiment could be conducted both in a country with relatively light DUI sanctions (target group of relatively severe offenders) and in one with relatively severe sanctions (target group of relatively light offenders). A significant reduction of DUI recidivism among severe offenders, however, will be more beneficial for road safety than a reduction among light offenders. Furthermore, a comparison between BAIID programmes with and without integrated rehabilitation would be useful.
The research consortium of the feasibility study recommends that the European Commission appoints a follow-up co-ordinator to whom trial proposals and grant applications can be submitted. In Annex 12 of the report, a list of proposed minimum standards for an EU field trial has been included.

CONTENTS

FOREWORD

This project was carried out by SWOV Institute for Road Safety Research, the Netherlands. The project group consisted of three other institutes: BASt Bundesanstalt für Straßenwesen, Germany; DTF Danish Transport Research Institute, Denmark; and VTT Building and Transport, Finland. SWOV received a grant from the Euro Commission of the EU to carry out the project.

This report could not have been written without the co-operation of many people. Firstly, we would like to thank the various experts in European countries who filled in the questionnaire we sent them. The questionnaire provided us with a great deal of useful information.

Secondly, we would like to thank experts in the field of alcohol ignition interlocks from Sweden, Canada, the USA and Australia who very kindly provided us with very useful information based on their own experience with interlocks. Thanks to these people, we have gained very important new knowledge.

Finally, we want to give special thanks to Douglas Beirness, Canada and Hans Laurell, Sweden for attending our seminar and delivering two excellent presentations.

In conclusion, we would also like to thank the people who attended the workshop about alcohol interlocks in June, 2001 at SWOV. The workshop inspired us all.

We hope that this report will be a source of inspiration for further interlock trials in European countries.

1. INTRODUCTION

Charlotte Bax (SWOV)

Alcohol is one of the major contributory factors in road traffic accidents, in particular in accidents with severe consequences. In EU countries, alcohol is a contributory factor in around 20 percent of the serious and fatal injury accidents (European Transport Safety Council, 1995). It is clear that preventing drink-driving would contribute significantly to the overall road safety level on EU roads.
The majority of EU countries are well aware of the problem. Common countermeasures such as targeted police enforcement, publicity campaigns and driver improvement courses have resulted in a steady decrease of drink-driving in many countries. However, despite the increasing availability and use of efficient and effective tools such as random and evidentiary breath testing, recent data (Sweedler, 1997) shows that the decrease has tended to stabilise. A countermeasure that makes drink-driving physically impossible is the Breath Alcohol Ignition Interlock Device (BAIID). The BAIID is an in-vehicle device that registers the amount of alcohol of the driver before starting the car and prevents the car from being started if a particular level of intoxication is reached. BAIIDs have been introduced in a number of States in the US, in Victoria Australia, and in Alberta Canada, where they are generally prescribed by courts to drivers who have been convicted for a drink-driving violation. Recently, an experiment with alcohol ignition interlocks has started in Sweden.

The EU-wide introduction of BAIIDs is potentially an effective measure to reduce the number of drink-driving accidents. However, what the actual effect may be, whether it is technically, legally and socially feasible in EU countries and, if so, which type of application and use can be expected to be most effective/successful in an EU context, is as yet largely unknown. In this project these questions are explored.

1.1. Objectives and specific research questions

The first objective of the feasibility study is to establish the possibilities and limitations of BAIIDs in a European Union framework. In order to do so, the following issues need to be clarified:
- For which target groups would a BAIID be most appropriate/effective and how could it best be applied?
- What are the technical requirements for the equipment, including reliability and proof against fraud and tampering, and do current BAIIDs meet the requirements?
- What are the legal requirements and limitations for application of BAIIDs and to what extent are BAIIDs legally feasible in EU countries?

The second objective is to define the approach and the conditions of an EU field trial with BAIIDs and its evaluation, specifying among other things:
- which groups of drivers/offenders and which application strategies are most promising to include in a field trial and how should the field trial be set up in order to get a scientifically valid indication of the effectiveness?
- which EU member states would be willing to participate in what type of field trial?

1.2. Partners and project organisation

The project was carried out by SWOV Institute for Road Safety Research, The Netherlands, as the main contractor. There were three subcontractors involved: BASt Bundesanstalt für Straßenwesen, Germany; DTF Danish Transport Research Institute, Denmark; and VTT Building and Transport, Finland.

1.3. Overview of chapters

An overview of the technical requirements of alcohol ignition interlocks was made by VTT and SWOV and presented in **Chapter 2.** It discusses issues such as the reliability of the equipment, prevention of fraud, and maintenance. Current experience, existing standards, and expert judgements by those who professionally work with alcohol interlocks were explored by looking at existing literature, and interviewing and consulting alcohol interlock manufacturers.
It has been taken into account that different target groups and different application procedures require different technical specifications. The requirements are listed and compared with the available equipment, their technical specifications and costs.

Chapter 3, 4 and 5 were prepared by VTT, BASt and DTF. Chapter 3 identifies the most suitable target group(s) for alcohol interlock applications. Chapter 4 defines the most appropriate/effective application procedures. In Chapter 5 conclusions of these two chapters are given. Existing literature concerning the drink-driving problem in the EU, international experiences with the application of alcohol ignition interlocks (procedures, effects), and data on public opinion and social acceptability served as the basis for these three chapters, as did interviews and personal communication with relevant experts. The chapters contains recommendations regarding:

- the target groups (e.g. first offenders, drink-driving recidivists; professional drivers of heavy goods vehicles, buses and/or taxis);
- selection and screening needs and methods to identify potential users;
- the application procedures (e.g. preventive, voluntary, to reduce the time of license suspension, to prevent license suspension altogether);
- the need for instruction and social, psychological and/or medical support for users and other ethical considerations;
- the most appropriate BAC threshold value (e.g. at the legal limit, under the legal limit, zero limit).

Chapter 6 discusses the legal requirements and conditions for the application of alcohol ignition interlocks in EU countries. BASt and DTF developed a questionnaire and distributed it amongst relevant representatives of a selection of EU member states and amongst countries with experience with interlocks. The questionnaire aimed to collect general information, e.g. by referring to analogue measures such as alternative punishment (e.g. task penalties), without going into detail about the national jurisdiction. Based on the results, a number of countries, which were already preparing a field trial, were approached in order to get more in-depth information. These findings are listed in Annex 8.

In **Chapter 7,** taking account of the outcomes of the preceding activities, a plan for a field trial with alcohol ignition interlocks in one or more EU countries is presented, developed by SWOV. The plan contains the following elements:

- Which target group(s) and which interlock application procedure(s) would be most suitable for a field trial?
- What type of equipment would be most suitable for the field trial(s)?

- Which process elements would need to be monitored?
- How should a field trial be set up to allow for scientific assessment of the effectiveness of the measure?

In **Chapter 8** the overall conclusions are stated and EU member states which showed interest in conducting a field trial are listed. In order to ensure input from all relevant parties, SWOV organised a one-day workshop in June, 2001. In addition to those directly involved in this study a number of experts from other European Research Institutes, the European Commission and representatives of potentially interested national authorities were invited to attend this workshop. A report of this meeting is given in Annex 9.
Finally, Chapter 8 provides an overview of the steps which are required to actually implement a field trial.

2. TECHNICAL REQUIREMENTS

Otto Kärki (VTT) & René Mathijssen (SWOV)

2.1. General introduction to BAIID

A breath alcohol ignition interlock device (BAIID), or ignition interlock, is an electronic device that is interconnected with the power, electrical and other control systems of a motor vehicle. The purpose of the ignition interlock is to prevent a driver from starting or operating the vehicle when the BAC (blood alcohol concentration), measured by means of a breath test, is above a predetermined threshold level ('fail level') (Comeau, 2000). Because the device is built-in in a car, every driver who uses the car, will have to use the BAIID.

The ignition interlock consists of two components, the part that is attached to the vehicle (**control module or relay module**) and the part that conducts the breath analysis (**sample head**) (Comeau, 2000). The sample head is connected to the control module, which has visual indicators and can produce audible cues. The sample head, which the driver has to blow into, is designed to fit easily into a person's hand. (Electronics Test Centre, 1992). A picture of a BAIID is presented in Annex 1.

The purpose of the control module is to:
- source and condition power for the operation of the BAIID;
- prevent starting of the vehicle if the BAC is above the fail level or a circumvention attempt is detected;
- enable starting of the vehicle after a valid breath test;
- detect the starting (running condition) of the vehicle;
- detect attempts to start the vehicle;
- sound an alarm (horn) if a violation is committed (Comeau, 2000).

The purpose of the sample head is to accurately conduct a breath analysis to determine whether the alcohol concentration is above or below the threshold level. The driver of the vehicle is instructed to stop, if a valid breath sample, i.e. below the fail level, is not conducted within the time allowed. A secondary identity confirmation test is also conducted to prevent blowing assistance, or any attempts to circumvent the test through the provision of false breath samples (so-called bogus or altered samples), (Comeau, 2000). The threshold value above which the vehicle will not start, can, for example, be set at 0.04% (fail level). There may also be a warning level giving a warning signal, set, for example, at 0.02% (warning level), and a high level, preventing operation of the vehicle within a fixed time, say within an hour. A valid breath sample is always required when the vehicle is started. Sometimes a restart without a further alcohol breath test is allowed within a fixed time, two minutes for example, after the ignition has been shut off.

There is a **data logger** in the control module of BAIID to record the results of all breath tests and attempts to start the vehicle without using the ignition switch. The dates, times and BAC levels of the breath samples are all logged in the control module. A fourth-generation BAIID design, which was released commercially in 2000, implements 'vehicle sensing technology' to monitor the use of the vehicle and to log the duration and length of any trips that are made (Comeau, 2000). Random rolling re-test is also required at random intervals, 20–30 minutes usually. Some BAIID models detect alcohol directly from the air. These models are regarded as less reliable than other models that require blowing into the sample head each time the vehicle is started (Laurell et al. 2000).

Type of sensor in the device
There are two technologies used in BAIIDs: semiconductor technology and electrochemical sensing technology (fuel cell). Most interlock models are still based on semiconductor technology.

Semiconductor sensors are easier to implement, they are more cost-effective and durable than electrochemical sensors. In addition, the semiconductor sensors are inherently better at meeting the accuracy requirements over an extended temperature range. The major disadvantages of this method are, however, the frequent need of calibration and the fact that it is not alcohol-specific. The measurement stability over time may vary and, hence, semiconductor sensors must be regularly serviced. Such sensors may also respond to other combustible gases and vapours, most notably cigarette smoke and vehicle exhaust. As a consequence, a positive reading may be given even if the individual has not consumed alcohol. For the driver using an interlock with this type of sensor, a false positive reading will prohibit legitimate use of the vehicle and create frustration. For programme administrators, this renders it impossible to determine whether low readings are the result of alcohol consumption by the driver or other volatile substances in the atmosphere (Beirness, 2001a).

Electrochemical sensing was first applied in ignition interlock devices in third-generation interlock models in 1994 and this system is gaining an increasing share in ignition interlock programmes. **Electrochemical sensors** are alcohol-specific and only respond to the presence of alcohol (Comeau, 2000).

The electrochemical alcohol interlock can, in theory, hold its calibration well and calibration is not always required during the field trials with this model. The reading of the electrochemical interlock is also unaffected by the volume of breath blown into it (Vulcan & South, 2000). However, the Guardian WR2, for example, requires blowing with certain volume to start the vehicle (Collier, Corneau & Maples 1995). The ability of the fuel cell model to assert alcohol specificity has made positive test results undoubted and now provides greater certainty for programme administrators who may wish to invoke sanctions against the test subject for positive alcohol test results (Comeau, 2000).

Based on experiences in Alberta Canada and in Sweden, the Guardian WR2 interlock model has met the accuracy requirements in extremely cold (-45 °C) weather conditions (Beirness et al. 2001, Allo, 2000a). The Guardian WR2 is said to be capable of operating accurately within the temperature range of –45 to +85 °C, 95 % humidity and at altitudes of up to 3 500 meters (Burger, 2001). In order to implement the use of electrochemical sensors within ignition interlock devices, special heating means may be required in order to achieve the levels of accuracy that are specified over the temperature range (Comeau, 2000).

Future technology
A fourth-generation BAIID design implements ‘vehicle sensing technology’ to monitor the use of the vehicle in real time and to log the duration and length of any trip that is made. It is now possible, even though not yet cost-effective, to implement GPS (global positioning system) and cellular technology within an interlock device to precisely define the position and motion of a vehicle and to report on violations, download events log data and update programme attributes remotely. The application of this technology in interlock devices would significantly improve the capability of programmes to monitor and control convicted drunk drivers during the term of an interlock programme in which the person is being supervised. Further, through the use of more powerful micro-controllers and larger memory capacity, user identification by means of biometric methods could be introduced in ignition interlock devices. With the events log data, concern has increased over the integrity and the security of the data (Comeau, 2000).

2.2. Protection against cheating with BAIIDs

There are two ways of cheating with BAIIDs: an attempt to start a vehicle without conducting a valid breath sample by the driver or an attempt to disable or disconnect the device.

First, a BAIID can be cheated with by **circumvention or bypass,** which means an overt, conscious attempt to provide an air sample to the BAIID other than a breath sample by the person who is authorised to drive the car with interlock. In this way a person with a BAC over the threshold may start the vehicle engine. Circumvention or bypass includes the use of a human breath sample that has intentionally been altered, so as to remove or reduce the amount of alcohol contained in the breath sample (Minnesota Alcolock rules 2000).

Second, a BAIID can be cheated with by **tampering**, which means an overt, conscious attempt to disable or disconnect the BAIID from its power source, or any other act intended to start the vehicle engine without providing a breath sample to the BAIID for analysis (Minnesota Alcolock rules 2000).

Anti-circumvention features were created for alcohol interlocks in order to prevent or at least substantially reduce the potential for a driver to circumvent, bypass or tamper the system. A key feature for preventing tampering and circumvention is the inclusion of a **data recorder** as an integral part of the interlock device. The primary purpose of the data recorder is to provide programme monitors (judicial or licensing authorities) with a record of all uses of the device, including attempts to tamper with, or circumvent, its functioning. Information about all attempts to start the vehicle (including the results of breath tests) and attempts to disconnect the interlock are recorded electronically (Beirness, 2001a).

In this context, the security of the data must be protected. Backup systems should be incorporated to ensure the information on the data logger will not be not lost if the power supply to the interlock is interrupted. It is also important that theft, loss, or disconnection of the sample head does not result in the loss of data. This requires that the data recorder be incorporated into a module that cannot be detached and/or the inclusion of a backup system that records vehicle starts even if the sample head has been disengaged. This also protects against unauthorised - and unrecorded - starts when the sample head has been removed (Beirness, 2001a).

Recording all attempts to tamper with or circumvent the interlock provides a general deterrent that will discourage most users from attempting to disengage or bypass the interlock system. In addition, the recording of these events provides programme monitors with documentation of programme violations so that appropriate action can be taken (Beirness, 2001a).

Temperature and/or pressure **sensors** are incorporated as a means to detect and prevent the use of samples that have been stored (e.g., in a balloon), filtered, or introduced by a mechanical device. All breath samples that are rejected by these sensors are recorded on the data logger (Beirness, 2001a).

Many alcohol interlock devices require repeated breath tests - '**running re-tests**' - at a random interval after the vehicle has been successfully started. The purpose of these 'running re-tests' is actually threefold: (1) to prevent the possibility of a bystander providing an alcohol-free breath sample that would allow a driver with a high BAC to operate the vehicle; (2) to detect drivers whose BAC is still in the ascending phase and has risen beyond the set point after the vehicle was originally started; and (3) to prevent drivers from leaving the vehicle idling while they drink (Beirness, 2001a).

Failing to provide a running re-test within the time allowed may result in a warning to the driver (either auditory or visual) or activate the horn or cause the lights to flash. In no instance would the interlock device stop the engine, since this might create a traffic hazard. After the warning, if a sample is not provided or if the vehicle is not stopped, the driver may be required to report immediately to the service centre or programme manager. Any re-test that registers a BAC in excess of the set point can lead to any of a number of consequences. For example, the interlock device could merely warn the driver of the failure and require the user to report to the programme manager and service technician, and appropriate action would then be taken against the offender. Failure to report to the service centre within a specified period could then result in the interlock preventing any further use of the vehicle (Beirness, 2001a).

As a means to prevent bystanders from providing an alcohol-free breath sample, some interlock systems have incorporated **driver recognition systems** such as 'hum-tone' recognition, breath-pulse codes or suck-blow codes. 'Hum-tone' recognition requires the driver to hum for a period of time while providing a breath sample (Beirness, 2001a). This requires some practice, usually 10–60 minutes (Allo, 2000 a and b). Repeated unsuccessful attempts by an inexperienced individual would result in a lockout situation. This system also prevents attempts to introduce a bogus (i.e., non-human) or filtered air sample (Beirness, 2001a). The blowing technique with hum tone may be taught to another person or a friend. This kind of circumvention has been rendered more difficult with the random rolling re-test requirement.

Interlock systems that incorporate the breath-pulse code requires the driver to provide a series of short and long breath pulses prior to a breath sample. To a large extent this prevents bogus and bystander samples. The breath-pulse code can also be used to identify the driver in cases where different people operate the same vehicle (Beirness, 2001a). Protection against tampering is generally provided by **sealing the wiring and circuits** in a manner that makes it easy to detect any attempts at alteration.

2.3. Existing technical standards of BAIIDs

Technical standards of BAIIDs have been defined in the USA, and in Canada and in Australia (see Table 2.1).

Alcohol interlocks must meet the technical standards required, regardless of the technique that is used. The National Highway Traffic Safety Administration (NHTSA) defined US standards of alcohol interlocks in 1992 and most BAIID models meet those standards. The standards of Australia, and Alberta in Canada are more difficult to meet because of the accuracy requirements of the BrAC (breath alcohol concentration) measurement, for example. The Alberta standards, which are also used in Sweden, are based on NHTSA standards (Laurell et al. 2000).

Table 2.1. *BAIID models which meet the technical standards of Alberta, Australia and NHTSA (Allo, 2000c).*

	Alberta (Canada) standards	**Australian standards**	**NHTSA Standards**
BAIID models that meet standards	Guardian WR2	Guardian WR2 Dräger	Guardian WR2 Guardian 1 Dräger Autosense Smart Start Lifesafer Intoxalock

NHTSA standards

The NHTSA defined the technical standards of BAIID models in the US on April 7th, 1992. The NHTSA standards have no validity in their own right, but other Government agencies and courts are encouraged to adopt them when introducing programmes. The NHTSA standards include the following requirements:

1) a requirement that in normal circumstances, eighteen of twenty samples with the reading of 0.1 g/l above the cut-off limit result in the vehicle not starting, and 90 percent of twenty samples 0.1 g/l below the cut-off allows the vehicle to start. The comparable limit in 'stressed' conditions, such as temperatures from –40 to +85 °C, variable voltage, vibration or frequent usage is 0.2 g/l;
2) a similar requirement at 0.2 g/l above and below the cut-off, seven days after the period during which the device must be brought in for service (the service interval);
3) a requirement that the device prevents the car from being started if it is not calibrated within seven days of the service interval;
4) the device must prevent or register circumvention. It must have a requirement for a random re-test between five and thirty minutes after starting the car, as a protection against a sober bystander starting the car (Vulcan & South, 2000).

The NHTSA standards for interlocks now clearly recognise the need for extensive anti-circumvention features as part of an effective interlock system, and prescribe specific features designed to prevent or at least detect, record and in some cases sanction tampering, bypassing or attempts to 'fool' the device (Collier, Corneau & Maples, 1995).

The Australian standard

The Australian technical requirements were set out in an Australian Standard, initially published on 17 June, 1988, and revised on 15 March, 1993. The tests required cover similar areas as the NHTSA standards, such as accuracy of BAC measurement and stability requirements. The major differences between Australian standards and NHTSA standards are as follows:

1) The accuracy test requires the correct response from the interlock device in 100 per cent of ten samples at 0.05 g/l above and below the cut-off point. There is no requirement for tests under 'stressed' conditions. There are also tests for the accuracy of the display 0.1 g/l in 100 per cent of three tests at zero, 0.2 g/l, 0.5 g/l, 0.8 g/l, and 1.0 g/l.
2) The device must pass the same accuracy tests after the service interval specified by the manufacturer, with the additional provision that the calibrated device must maintain accuracy for at least thirty days.

3) The device must activate an audible and visible alarm, if it is not re-calibrated after thirty days, or the period specified by the manufacturer. This provision does not apply to self-calibrating devices.
4) The Australian standard covers the breath alcohol measurement process only, and does not contain provisions relating to methods of circumvention, or tampering.
5) The reading on the display must be within 0.1 g/l at a BAC of 0.1 g/l, when tested at (simulated) breath flow rates of 5 litres per minute above and below the manufacturer's recommended figure (Vulcan & South, 2000).

Alberta standards

The most demanding anti-circumvention requirements have been formulated in Alberta, Canada, where the approach taken by administering authorities has been to combine highly sophisticated technology with a comprehensive programme of close monitoring and supervision, which involves active and ongoing participation by the interlock service provider (Collier, Corneau & Maples, 1995).

The minimum requirements for BAIID to be qualified for use in the province of Alberta, Canada include the following:

1) BAIIDs must be robust and reliable.
2) BAIIDs must be alcohol-specific.
3) BAIIDs must maintain accuracy between the manufacturer's calibration periods.
4) BAIIDs must be very difficult to circumvent.
5) The manufacturer/operator of the BAIID programme must be able to prove continuing compliance of the BAIIDs being issued to users.

BAIIDs that could be used in Alberta have to pass four groups of tests, as follows:

1) Group 1 - Durability tests: these tests are designed to provide a level of confidence in regard to the overall ruggedness of the device. The tests in Group 1 include: general functional test at the following ambient conditions: temperature cycling tests between –40 to +85 °C, humidity exposure test for 60 hours at 40 °C and 95% R.H. and vibration test.
2) Group 2 - Environmental accuracy tests: these tests are designed to measure the accuracy performance of the BAIID under various environmental conditions. The accuracy requirements are the same for all of the environmental tests except for the –45 °C and +85 °C conditions. For these extreme temperatures, a reduced accuracy requirement is allowed. The accuracy requirements are listed below:
    - All environmental conditions except –45 °C and +85 °C: from the results of twenty trials, the device shall not enable ignition of the vehicle at least 90% of the time when the true BAC value is 0.5 g/l. From the results of ten trials, the device shall enable ignition at least 90% of the time when the true BAC value is 0.3 g/l.
    - For the –45 °C and +85 °C conditions: from the results of twenty trials, the device shall not enable ignition of the vehicle at least 90% of the time when the true BAC value is 0.6 g/l. From the results of ten trials, the device shall enable ignition at least 90% of the time when the true BAC value is 0.2 g/l.

In addition to accuracy tests in various temperatures, altitude tests and dust exposure tests are also included in group 2. The altitude tests are performed in a vacuum chamber with conditions equivalent to 2,500 m of altitude by using simulators of 0.3 and 0.5 g/l BAC. The dust tests are performed in a 3 ft. cubical box by using 4.54 kg of fine dust agitated by fan blower. The BAC accuracy tests are performed by using simulators of 0.3 and 0.5 g/l BAC.

3) Special BAIID performance tests: these tests address the very important BAIID performance requirements: test for deep lung sample, alcohol specificity test, human subject test, tampering and circumvention test, calibration stability and lockout test.
4) EMI/EMC (Electromagnetic interference/Electromagnetic compatibility) tests: these tests are performed to provide a level of confidence that electromagnetic interference from the BAIID to the vehicle or vice versa will not be a problem. This test group includes:

conducted emissions test, radiated emissions test, conducted susceptibility test and conducted emissions test (Electronics Test Centre, 1992).

Comparison of various standards
To conclude, all the BAIID standards have requirements of the accuracy of the BAC right after the calibration and after the service interval (stability). It is also possible that BAIID is not calibrated at all during the test period, as in the Swedish experiment for example (Allo, 2000 a and b). The biggest difference between the Australian standards, the NHTSA standards and the Alberta standards is the fact that the Australian standards are designed for the breath alcohol measurement process only. In addition, the Australian standards are stricter in terms of accuracy of alcohol measurement process than the NHTSA and Alberta standards.

The accuracy tests under stressed conditions are not included in the Australian standards. The Alberta standards are somewhat more stringent than the NHTSA standards in the requirement for accuracy under extreme conditions and require that the device be specific to the measurement of alcohol.
It has to be emphasised that the ability of the interlock to perform its intended function does not necessarily depend on the accuracy with which it measures alcohol. The critical factor is that the device is able to distinguish accurately between persons who are above or below the pre-set threshold BAC. In this context, both semiconductor and electrochemical alcohol sensors are capable of achieving a very high level of performance (Beirness, 2001a).

The Australian standards do not include anti-circumvention features. In Europe the temperature requirements of interlocks have to be met because of the large temperature variation. Finally, it has to be stressed that BAIID standards have no legal validity in their own right, but interlocks must meet the technical standards required regardless of the technique used.

It is not easy to make independent comparisons with various interlock models, because of the somewhat exaggerated claims by BAIID providers about their BAIID models. Various tests can nevertheless be done by independent test laboratories. At least Guardian WR2 and Dräger hold their calibration well. The Swedish experiences with the Guardian WR2 model are good, even though some minor problems have occurred with some food substances and snuff (Laurell et al. 2000, Allo, 2000 a and b). The Dräger and Alcolock® BAIID models have been approved for voluntary use in Germany and Austria.

In addition to technical solutions, it is important how the technology is used in BAIID programmes. Organisation and co-ordination between various authorities of a BAIID programme should run smoothly. For example, BAIID legislation and technical standards of BAIIDs should be unified to enhance comparability and reliability of the results of the research (Marples, 2000).

2.4. Usability test with two interlock models

Two interlocks, a Dräger interlock by SWOV in the Netherlands and a Guardian WR2 by VTT in Finland, were tested as part of this project. The purpose of the tests was to identify some inconveniences and safety aspects of interlock usability (interaction between human being and machine), and further relation to traffic safety. The same questionnaire (Annex 4) was used in the SWOV tests and the VTT tests. However, there were some differences between the training of the test drivers and performing random rolling re-tests at SWOV and VTT. The drivers were considered trained to drive a car with interlock after one successful attempt to

start the car at SWOV; at VTT, drivers were considered trained after two-three consecutive successful attempts.

2.4.1. Preliminary interlock testing by SWOV

On 15 February, 2001, a Dräger Interlock was installed in a SWOV company car for some preliminary testing aimed at getting information on inconveniences and safety aspects of BAIID use. The testing was especially concentrated on two anti-circumvention features:

1. *The suck-blow sampling procedure* should prevent the deliverance of a non-human breath sample and, to a certain degree, the deliverance of a breath sample by other people than the car driver. The driver was asked to breathe in deeply, suck briefly (less than half a second) and sharply, immediately to be followed by an even blow – the so-called suck-blow technique. The minimum breath volume required was set at 0.8 l (adjustable from 0.5-1.8 l; typically 1.2 l).
2. *The random rolling re-tests* require the same sampling procedure as mentioned under point 1. Not passing the test within the allowed time only activated an internal audible signal. No external signals (e.g. blaring horn, blinking alarm lights) were activated.

Some other important features of the Dräger Interlock in the SWOV company car were:

1. The BAC threshold was set at 0.2 g/l.
2. The interlock was provided with a hidden by-pass switch, to be used in case of an emergency. SWOV employees, who were not able to start the car owing to false positive test results or to their inability to correctly complete the sampling procedure, could phone the SWOV project leader. Then they were told where to find, and how to use, the by-pass switch. According to the Dräger instructions for use, the operation of the by-pass switch would be recorded in the data memory. In practice, however, this appeared not to be the case if, before using the by-pass switch, the sample head was detached. This was a result of the data logger being integrated in the sample head. According to the manufacturer, in the next generation of the interlock, the data logger will be integrated in the central control unit, which will solve the problem.

Test design

Before using the interlock-equipped car, drivers were instructed verbally and given a short training session of about 5 minutes on the suck-blow technique. After completing the sampling procedure successfully, a 15–minute restart period prevented further training. Therefore, in principle, the drivers were considered trained after one successful attempt to start the car.

In addition to the very limited training, the drivers received a written instruction. In this instruction it was stated, among other things, that no rolling re-tests should be performed. After the interlock's request for a rolling re-test, the driver had to stop the car safely before initiating the sampling procedure. More-experienced interlock users, however, were given verbal permission to perform a rolling re-test.
An interlock user was deemed to be more experienced, if, after returning the car to SWOV, he/she reported not having suffered major inconveniences from performing the suck-blow technique.

After each trip, the driver had to fill in a short questionnaire (see Annex 4). More-experienced drivers who had performed rolling re-tests were additionally interviewed regarding the effects of performing the rolling re-tests on course-holding and tracking.

Test results

In the period from 15 February to 10 May, 2001, nine less-experienced and five more-experienced interlock users made trips of varying lengths and durations, covering different kinds of road types inside and outside built-up areas. The less-experienced users made 31

trips, with an average duration of approx. 50 minutes (shortest: 5 minutes; longest: 2 hours and 10 minutes). The more-experienced users made 13 trips, with an average duration of approx. 55 minutes (shortest: 12 minutes; longest: 2 hours and 20 minutes). One less-experienced user made 7 trips before returning the car. This explains why the average number of trips per less-experienced user was higher than the average number per more-experienced user.

At the start of the 31 trips by less-experienced interlock users, the drivers involved succeeded 10 times in completing the suck-blow procedure at the first attempt (31%); 12 times they succeeded after 2-5 attempts (39%); and 4 times they succeeded after more than 5 attempts (13%). One less-experienced user needed 25 attempts at the start of his first trip, and no less than 75 attempts at the start of his second trip. After an additional training of approx. half an hour (net) he succeeded in starting the car after 2-5 attempts. And, finally, one less-experienced driver did not succeed at all at the start of 4 trips (13%). After a 5 minutes' training he succeeded in starting the car after one or two attempts.

During the 31 trips by less-experienced drivers, 18 rolling re-tests were requested. Four of them were performed within 5 minutes after the request (22%), 7 more than 5 minutes after the request (39%), and another 7 were not performed at all (39%).
Five out of the 9 less-experienced interlock users (56%) reported that the interlock caused inconveniences due to the difficult suck-blow technique. One less-experienced user reported that stopping the car in a safe way was not always possible.
At the start of the 13 trips by the more-experienced interlock users, the drivers involved succeeded 8 times in completing the suck-blow procedure at the first attempt (62%), another 4 times they succeeded after 2 attempts (31%), and once the driver needed 3 attempts (8%).

During the 13 trips by more-experienced drivers, 24 rolling re-tests were requested. All of them were performed within 5 minutes after the request, 17 of them (71%) 1 minute or less after the re-test was requested.

Two out of the 5 more-experienced interlock users (40%), when verbally interviewed, stated that at their first rolling re-test they had some minor problems with course-holding. None of them had any problems with tracking, and none of them reported that the suck-blow technique caused inconveniences.

Table 2.2. *Number of sampling attempts needed to start the car, by less- and more-experienced interlock users, respectively*.

	Number of trips	**Number of sampling attempts to start the car**		
		1	2-5	> 5
Less-experienced users	31 (100%)	11 (35%)	12 (39%)	8 (26%)
More-experienced users	13 (100%)	8 (62%)	5 (38%)	0 (0%)

At the end of the testing period, the connector of the interlock's detachable sample head broke down, necessitating the use of the by-pass switch to start the car.

Discussion of test results
The results of the very limited number of SWOV tests indicate that Dräger Interlock users who are not sufficiently trained, experience difficulties in presenting a valid breath sample, owing to the suck-blow technique that is required. Therefore, this technique seems to be an effective anti-circumvention feature in that, to a certain degree, it will probably prevent a bystander from delivering a breath sample for a drinking driver participating in a BAIID

programme. To well-trained users, however, the suck-blow technique does not seem to pose major sampling problems.

The fact that some drivers experienced minor problems with course-holding, when performing their first rolling re-test, suggests that BAIID users should not only be trained in the suck-blow technique as such, but also in performing it while driving, either in real traffic or in a simulator.

Further testing of BAIID use safety aspects is recommended. It is important, for instance, that the sampling procedure can be completed without the driver having to take his eyes off the road. The Dräger Interlock's audible signals seemed to be sufficient in this respect.

The interlock in the SWOV test car was installed with a by-pass switch. Whether a by-pass element should be made available to drivers participating in a BAIID programme will depend on the BAC threshold, and on the reliability and accuracy of the interlock device. Information from existing BAIID programmes on these issues could be very useful. If allowed, the use of a by-pass element should be restricted to a very limited number of emergencies, it should be recorded in the data memory, and it should lead to a visit to the service provider at very short notice.

2.4.2. Interlock testing by VTT

A usability test with the Guardian WR2 interlock model was conducted at VTT in April, 2001. The following *anti-circumvention features* were included in the test:

1. *Hum-tone recognition*: During a test the user had to blow into the sampling head, then after some 3 seconds introduce a hum without interrupting the air flow or altering the pressure. The hum requirement was designed to ensure that the sample being analysed is human breath. Since the technique involved tends to be difficult for the untrained user, this feature also represents an effective way of thwarting possible attempts to obtain 'curbside assistance' to start an interlock-equipped vehicle.
2. *Blow abort*: This feature ensures rejection of a breath test of insufficient pressure or duration to yield a 'deep lung' sample of alveolar air for analysis.
3. *Random rolling re-tests* require the same sampling procedure as mentioned under point 1. Not passing the test within the allowed time only activated an internal audible signal and a visual signal on the interlock's display. No external signals (e.g. blaring horn, blinking alarm lights) were activated.
4. *Time lapse fail*: The drivers had three plus three minutes to comply with a re-test requirement. No external alarm was activated.

Test design

Three persons, two male and one female, tested the interlock twice. Before using the interlock-equipped car, drivers were instructed verbally and trained in the correct blowing technique concerning the combining of hum-tone and blowing volume (blow abort) required, for 10–15 minutes. They were also instructed on how to comply with the random rolling re-test requirement. The drivers also received short written instructions. Each driver performed two test drives: the first drive on a two-lane road with a speed limit of 70–80 km/h. The second drive was performed in an urban area where the speed limit was 40–50 km/h. After each trip, the driver had to fill in a short questionnaire (Annex 4).

The test drivers had basically two tasks to undertake: 1) to start the vehicle after giving a valid breath sample including a hum-tone and blow abort; 2) to pass a random rolling re-test by giving another valid breath sample including hum-tone and blow abort. The random rolling re-test requirement was given between 8–16 minutes after the beginning of the test drive.

Test results
One test driver could start the car at the first attempt in both test drives, one test driver at the first and second attempt, and one test driver at the second and third attempt. The test drivers did not have previous experience with interlocks.
The female test driver found it difficult to learn the correct blowing technique. She regarded the required blowing volume as too great. In addition, her hum-tone was too high at first. All the test persons learned the timing of blowing and the blow-abort feature quite well within 10 minutes. One male driver experienced some stress when performing the random rolling re-test of the first test drive, because he could only pass the test after a couple of attempts. All the test drivers were able to keep their eyes on the road while performing random rolling re-tests.
Two of the test drivers experienced no negative safety effects during the test drives. One of the male drivers felt that his driving speed increased unconsciously during both test-drives while performing the random rolling re-test. To conclude, using the vehicle equipped with a Guardian WR2 interlock model was not easy for any of the drivers after 10–15 minutes of training. However, after the training, the driving performances with random rolling re-test combined with hum-tone and blow abort were good.

2.5. Technical requirements not covered by present standard

Two issues in the field of technical requirements have not yet been covered by the existing standards which have been discussed in this chapter. In the first place, specific technical specifications may be necessary for specific target groups. Secondly, national legislation which forbids driving while operating a handheld device may obstruct the use of a BAIID. It will be discussed which technical specifications are required to conform to this legislation.

2.5.1. Technical requirements for different target groups

Results from the Alberta interlock programme suggest that the duration of programme participation should be linked to the success of the individual in the programme (Marques et al. 2000b). High-risk offenders, those having frequent DUI offences for example, could have an interlock programmed in the way that their vehicle could be operated at certain times of a day or a week only. As the participant demonstrates success, the restrictions could be gradually relaxed to allow driving at other times/days (Beirness, 2001a). Other technical specifications may also be considered for different target groups, especially for professional driving. However, in terms of the usability of alcohol interlock, it can be asked whether the user will be able to comply with anti-circumvention features of the interlock comfortably after proper training, or whether he/she should be allowed to drive with an interlock vehicle at all. Random rolling re-test requirements are recommended for the studied types of interlocks in private vehicles. Elderly DUI offenders having difficulties complying with anti-circumvention features should undergo rehabilitation only, rather than be allowed to drive with an interlock vehicle. Allowing driving with an interlock vehicle without anti-circumvention features or easier anti-circumvention features for DUI offenders suffering health problems, for example asthma, is also questionable.
Different BAC threshold values (fail levels) could also be considered for different target groups. For example, alcohol-dependent people or novice drivers could have 0 as the BAC threshold. According to EU-directive 91/439/EEC (Annex 3), alcohol-dependent people should not be allowed to drive at all. Another argument against the 0 BAC threshold is the possibility of false positive readings when a 0-limit is used, because of food substances for instance. Provided that the BAC threshold is set under 0.4 g/l there is no need to set the BAC threshold individually according to the number of prior DUI offences either. The BAC threshold of 0.2 g/l is recommended for the EU field trial on interlocks.

2.5.2. Technical requirements in connection with hand-held operation

Although the visual distraction while operating a BAIID is considered to be low, a (legal) problem may arise with the introduction of BAIIDs in EU countries. Within Europe several countries (Austria, Portugal and Switzerland) have specific legislation which forbids the use of hand-held mobile phones while driving. Other countries (Germany, Belgium, Spain and the Czech Republic) have the intention to introduce legislation on this topic. Most countries have a general law to prevent people to carry out activities which cause distraction from the driving task. Therefore, it is useful to consider what technical specifications are necessary in order to meet the requirements of these laws.

The primary safety criterion BAIIDs will have to meet is that rolling re-tests can be performed without visual distraction and/or unintended manoeuvring. This implies the following technical requirements:
- The sample head has to be installed in a place in the cabin where it can be taken and replaced without the driver having to take his eyes from the road or to change his position behind the steering wheel.
- The request for a running retest and the sampling procedure should only be accompanied by unambiguous auditory signals.
- Performing the running retest should be possible without interfering with other aspects of the driving task, e.g. steering, braking, accelerating, and gear-shifting.
- After the first running retest, the interval periods between successive retests should be as long as is considered safe with respect to the primary goal of BAIIDs .
- The sampling period should be as short as possible.

In addition to these technical requirements, it is advisable to train all BAIID users in real traffic or in a simulator.

2.6. Conclusions

The factors that determine the type of BAIID to be selected for use in a particular interlock programme, are cost, stability, and specificity to alcohol (Beirness, 2001a). Accordingly, it is recommended that only the fourth-generation BAIIDs based on electrochemical sensing technology (fuel cell) be used in prospective EU field trials of interlocks, because the fuel cell devices are alcohol-specific. In addition, it is recommended that the BAC accuracy requirements over an extended temperature range (-45 to +85 °C) mentioned in the Alberta interlock standards are met to enable the participation of Northern European countries in the trial. It is possible not to have a calibration requirement during the BAIID installation period, as in the Swedish BAIID experiment programme. Provided that calibration is not required during the BAIID installation period, the stability of the BAC threshold of the BAIID model used should be ensured. Different technical BAIID specifications may be considered for professional driving, while different specifications are not recommended for private vehicles in a BAIID programme.

A data recorder in the interlock is a necessary element to recognise and inform the programme monitors on tampering, bypass and circumvention attempts. Present BAIIDs are fairly effective against cheating, provided that they are properly mounted with sealed wiring. By using anti-circumvention features, BAIIDs recognise artificial breath techniques and filtered air. False positive results caused by other substances than alcohol may occur if a semi-conductor interlock is used. A non-zero BAC set point is also recommended to avoid false positives and lockouts. Programme administrators must be able to dismiss claims by users that positive results are due to some other substance. That is one reason why fuel-cell-based interlocks should be used. Limiting driving by high-risk DUI offenders to certain times

and days in a week should be considered. No other technical specifications for different target groups are recommended, provided the BAC threshold is set at 0.2 g/l, as recommended before.

The biggest problem with BAIID use, which is technically impossible to solve, is the fact that a BAIID user may drive a vehicle that is not equipped with a BAIID, even though it is prohibited and may lead to sanctions (Voas & Marques, 1992b). Another problem is the fact that all family members will have to use the interlock. Interlock providers may also give exaggerated claims about the interlock to support their business (Beck et al. 1999), for example, the accuracy of alcohol sensing may vary.
The assistance of a sober person in driving a BAIID vehicle while the BAC is over the interlock set point is virtually eliminated by anti-circumvention features like hum-tone recognition, blow abort, suck-blow, and random rolling re-test requirements. To conclude, anti-circumvention features are necessary elements of BAIID and some possible negative safety effects of random rolling re-tests can probably be eliminated by proper instruction and training.

BAIID users should be properly instructed in the correct blowing technique before starting to use the interlock. The instructions and the training should be arranged so well that persons below average intelligence, as well as those having below average driving ability, could also manage the BAIID in all situations. The results from the usability test performed at SWOV and VTT suggest that hum-tone or suck-blow techniques should be trained sufficiently, while driving in real traffic or in a simulator. The SWOV tests also indicate that the use of a by-pass element should be restricted to a very limited number of emergencies, like technical failures of the BAIIDs. Provided that fuel cell interlocks are used, the by-pass element is seldom needed.

Health problems that have been observed for some drivers when conducting random re-tests cannot entirely be tackled by technical means. Particular emphasis has to be put on medical examinations of the drivers concerning their capability to blow and drive a car with a BAIID. The sample head of the BAIID should be installed in the vehicle in a way that it is easy to handle, and the display of the control module of the BAIID should not be susceptible to glare, but be easily visible to the driver. A random rolling re-test requirement may cause stress to some drivers, if not passed at the first attempt, and may consequently increase accident risk. Yet, the results of preliminary testing of BAIIDs show that there do not seem to be many negative effects on visual performance because of the random rolling re-test requirement. Both internal visual and audible signals of the actions the BAIID gives are necessary, especially the audible signal warning the driver to keep his eyes on the road. The internal signals of Dräger and Guardian WR2 seemed not to impair the visual performance of the driver. However, further testing of the safety aspects of the use of BAIID is necessary.

3. REVIEW OF TARGET GROUPS FOR APPLICATION OF INTERLOCKS

Otto Kärki (VTT) & Claudia Evers (BASt)

3.1. Introduction

The problem of drink-driving mainly concerns incidents in which the legal alcohol limit has been exceeded. An occasional drink-driving offence does not necessarily indicate a drinking problem, provided the BAC (blood alcohol concentration) is not high. During a social event, drinking may result in the legal limits of 0.2 and 0.5 g/l being exceeded slightly. By contrast, alcohol abusers tend to have high levels of alcohol when arrested for drink-driving (Mäkinen & Veijalainen, 1997).
Today 42 US states and several areas of Canada and Australia provide a programme or law authorising the fitting of alcohol ignition interlocks. A field trial started in Sweden in February, 1999 (see description in Annex 2). Some feasibility research on BAIIDs was also done by SWOV Netherlands in the early 1990s (Van der Sluis, 1994).
Some 35,000 alcohol interlock devices are currently in use in the US most of them on a voluntary basis. Some 20% of drink-driving offenders use the interlock voluntarily. Multiple studies in Canada and the US have found that the alcohol interlock device reduces drink-driving while installed, but that alcohol offences return to near control levels once the device is removed.
The DUI offenders considered for use of alcohol ignition interlock are:

- First DUI offender - a driver who has been convicted for drunk driving for the first time;
- Second DUI offender - a driver who has been convicted for drunk driving for the second time
- Multiple DUI offender - a driver who has been convicted for drunk driving several times

3.2. Results of BAIID programmes

BAIID programmes are carried out in many different ways and the results are not always comparable with each other (Marques et al. 2000a). The results from seven studies are summarised in Table 3.1. The DUI recidivism rates for interlock users and non-users in each study are shown both during the period of installation and after removal. Some of the studies will be reviewed in more detail in the following paragraphs.

Table 3.1. *Comparisons between recidivism rates of interlock users and non-users during the period of interlocks installed and after removal (Marques et al. 2000b).*

Jurisdiction**	Characteristics of population	Findings: Recidivism rates during interlock period	Findings: Recidivism rates after interlock period	Comparison group
1. Ohio	First offenders over 0.20 BAC plus multiple offenders	Interlock 2.9% Non-interlock 8.4%	Interlock 6.6% Non-interlock 6.5%	Suspended licence
2. Oregon	Multiple offenders	Interlock 5% Non-interlock 8%	Interlock 10.8% Non-interlock 11.5%	Restricted licence
3. North Carolina	Second offenders	Interlock 2.7% Restricted 8.4% Suspended 7.1%	Interlock same or higher than non-interlock	Restricted licence & suspended licence
4. Alberta	Multiple offenders	Interlock 10% Non-interlock 25%	Interlock 7% Non-interlock 11%	Suspended licence
4. West Virginia	First & second offenders	Interlock 1.6% Non-interlock 6.4%	Interlock 10% Non-interlock 10%	Licensed & suspended licence
5. Maryland* Random assignment	Multiple offenders	Interlock 2.4% Non-interlock 6.7%	Interlock 3.5% Non-interlock 2.6%	Licensed
7. Alberta	Multiple offenders	Interlock 0.85% Non-interlock 8.08%	Interlock 7.05% Non-interlock 7.32 %	Suspended licence

*In the Maryland study, the comparison is between offenders required to have interlocks (40% of whom chose not to install interlocks) and offenders without that requirement.
**References: 1. Elliot & Morse (1993); 2. Jones (1993); 3. Popkin et al. (1993); 4. Weinrath (1997); 5. Tippetts & Voas (1998); 6. Beck et al. (1999); 7. Voas et al. (1999)

3.2.1. Recidivism rates for interlock users compared to non-users

The only known BAIID programme based on random assignment was carried out in **Maryland, USA** in the mid-1990s. The study was limited to multiple DUI offenders who had been convicted for two or more prior alcohol-related traffic offences in the previous five years, or three or more such offences in the previous ten years. The programme was administrated by the state licensing agency.
For the random assignment BAIID programme in Maryland, 1387 Multiple DUI offenders with revoked or suspended licences were chosen. Driving records of 698 interlock offenders and 689 control group offenders were examined. There were no significant differences between the demographic variables of these groups. One year after assignment 2.4% (US average 3.4%) of offenders assigned to the interlock programme and 6.7% (US average 9.8%) of offenders in the control group had committed an alcohol-related traffic violation. The difference between re-offences of the two groups was statistically significant. The results indicated that being involved in the interlock group reduced the risk of an alcohol-related traffic violation within the first year by about 65% (Baker, Rauch & Beck 1997).

An interlock study was carried out in **West Virginia, USA** between 1990 and 1996. An alcohol interlock was installed for 137 first-time DUI offenders and 761 second-time DUI offenders. DUI offences of interlock users were compared with all other comparable offenders in West Virginia as the control group. The records of 35,822 drivers who committed

drunk-driving offences between January 1st, 1990 and March 31st, 1996, were examined. Among first DUI offenders, none re-offended during the first five months with the interlock. Furthermore, the difference in re-offence rates between the interlock group and the control group of first DUI offenders was not statistically significant. After twelve months for second DUI offenders with interlock in their vehicles the re-offence rate was 1.6%, compared to 6.4% for comparable offenders without interlocks. However, after removal of the interlock, programme, participants had no better recidivism records than the control group. Nonetheless, it should be noted that the interlock group of second DUI offenders were fully relicensed after removal of the device, whereas the control group had to remain fully suspended for at least five years. This may indicate that the control group drove more carefully than the interlock group (Tippets & Voas, 1998).

An interlock experiment in the state of **North Carolina, USA** was carried out in the early 1990s to test the recurrence of DUI among four groups of second-time DUI offenders. All such offenders in North Carolina receive a 4-year hard licence suspension. At the end of the second year they could apply for an administrative hearing, which could grant a conditional licence. Using data from the North Carolina driver history files, a quasi-experimental design was used to examine the recidivism rates of offenders in the following four groups, one with interlock and the other three without:

1) interlock group, that obtained a conditional licence and had an ignition interlock installed in their cars; and
2) non-applier group, who never applied or completed the application process;
3) denied licence group, who completed their applications but were denied a conditional licence or refused the offer of a conditional licence with mandatory participation in the interlock programme;
4) conditional licence group, who obtained a conditional licence but were not required to participate in the interlock programme.

The failure (recidivism) rates among these groups were 2.9%, 18.2%, 4.7% and 5.2%, respectively (Popkin et al. 1993). These figures are not exactly the same as those in Table 1, reported by Marques et al. (2000a). The difference in the re-offence rate of the interlock group is 0.2% according to Popkin et al. (1993) and Marques et al. (2000a). However, the recidivism rate for the interlock group rose to the level of comparison groups or higher after full licences were restored to them and the interlocks removed.

In **Alberta, Canada** the interlock programme started in 1990. Since then, 4000 interlocks have been installed, corresponding roughly to 10% of convicted drink drivers in the province in the 1990s. The fail level of the interlock is 0.4 g/l and the warning level 0.2 g/l in Alberta (Beirness et al. 2000). The hard suspension period required is three months for voluntary interlock users and six months for mandatory users. Some rehabilitation is also required. The minimum interlock period in Canada is six months and the average interlock period eight to ten months (Marques et al. 2000a).
An interlock group of 818 multiple DUI offenders and a control group of 4110 persons were studied in Alberta, Canada during 1990-93. The installation period of the interlock was two years. The re-offence rate of the interlock group was 11% and in the control group 15%, two years after the start, when the interlock was removed. After six years 18% was caught drink-driving, compared with 38% of the control group. The study was carried out on a voluntary basis. Re-offence is most likely during the first year after removal. According to this study some long-term effects of interlocks can be observed. It was also suggested that those who were caught soon after removal, should have an extension of the interlock period.

According to research results from Alberta the DUI offenders who are most likely to repeat the offence are the ones who need the interlock most. The group most likely to re-offend in Alberta is considered to be the group of DUI offenders who are deemed ineligible for the interlock programme, because of committing another DUI offence before completing the minimum period of suspension prior to starting the interlock program. This group of offenders

had the worst repeat offence record of any of the groups in Alberta, despite the fact that the group remained fully suspended over the entire interlock period (Beirness, 2001b).
To conclude, the expected effects of BAIID on repeated drink-driving while having the interlock installed ranges from a 28% to 65% reduction in offences (Voas et al.1999).

3.2.2. Recidivism rates for interlock users in the before-, during- and after-period of interlocks

Since December, 1997 a voluntary alcohol ignition interlock programme has been in place in Quebec, Canada. Over the period 1997-98 the average interlock period was 226 days and the sample was 4160 interlock users, about 20% of suspended DUI drivers in the province. Of the interlock users 80% were first-time offenders, 92% of these were men and the average age was 39 years. The method of the study was a before-during-after comparison. No control group was included in the study. The results reported in June, 2000 included data only for six months of the after-period. However, DUI convictions and accident history included data from the last five years of the before-period (Dussault & Gendreau, 2000). According to the data, available figures for re-offences and crashes showed a significant decrease during both the interlock and after-periods (Table 3.2). However, it is too early to draw any formal conclusions in view of the short after-period (Dussault & Gendreau, 2000).

Table 3.2. *Traffic convictions, DUI convictions and crashes before, during and after participating in the BAIID programme, N = 4160 (Dussault & Gendreau, 2000).*

	Before		**During**		**After six months**	
	Number	Number per 10,000 days of exposure	Number	Number per 10,000 days of exposure	Number	Number per 10,000 days of exposure
Days of exposure	7 428 528	-	929 331	-	605 724	-
Traffic convictions	10 222	13.76	927	9.97	591	9.76
DUI convictions	5509	7.42	15	0.16	26	0.43
Casualty crashes	934	1.26	42	0.45	26	0.43
Property damage only crashes	2 743	3.69	129	1.39	102	1.68

3.2.3. Recidivism rates for interlock users after ending the BAIID programme

The recidivism rate of first-time DUI offenders (n = 1373) was followed in Calgary (interlock intervention with harm reducing intervention) and Edmonton (only the interlock), Canada, during the first twelve months after removal of the interlock. Those in Calgary had roughly half the rate of DUI offences at the end of twelve months, compared with those in the control group in Edmonton (Calgary: n = 6 of 610, Edmonton: n = 16 of 747). The findings, however, are not statistically significant. The group of repeat offenders constituted too small a sample to show any difference in re-offence rates after twelve months (Marques et al. 2000b). Furthermore, results from a survival analysis showed that the group having numerous failed BAC readings during the interlock period were two to three times more likely to commit a re-offence during the first twelve months after removal. The results suggest that those who have a high rate of failure should be required to have an extended interlock period (Marques et al. 2000b).

3.3. Misuse of BAIIDs: effect of availability of a non-interlock vehicle

Vehicle use by 2260 interlock users and availability of non-interlock vehicles was studied in Alberta, Canada in 1995–99. Over half of the interlock group had at least two cars available. When there was another vehicle in the family, there was a tendency for fewer trips in the interlock vehicle. No evidence was found that those who had at least two vehicles available had themselves driven a vehicle not having an interlock installed. Concluding from the results, the availability of a non-interlock car, while reducing the overall number of trips in the interlock vehicle, did not substantially reduce the number of breath-test failures. Thus, it is not necessary to require interlocks on all vehicles owned by the offender for an interlock programme to be effective (Voas et al. 2000).
The number of night-time (weekend) trips was not significantly less when another car was available. This suggests that the reduction in trips in the interlock vehicle decreased during daytime hours, rather than at night when most drinking occurs (Voas et al. 2000).

3.4. Rehabilitation programmes

When selecting the user groups for the experiment, it should be pointed out that the effects of BAIID seem to be limited mainly to the time period when drivers have the device fitted in their vehicles. After termination of the experiment, drink-driving tends to return to former levels. For this reason it is advisable for drivers involved in the experiment to have the chance of participating in a rehabilitation programme supporting the use of BAIID.
Rehabilitation is a very broad term encompassing education programmes, psychological counselling, and medical treatment. These are designed to persuade or help drivers of motorised vehicles not to drive after drinking alcohol. The available evidence indicates that rehabilitation programmes are effective in improving driver behaviour and reducing re-offence rates. European countries currently known to run officially approved rehabilitation courses aimed at drink-drivers are Austria, Belgium, Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden and the UK. Portugal plans to introduce them (Openshaw, 2000).
A number of EU states regard drink-driving rehabilitation as a matter of psychological intervention rather than simple education. According to Openshaw, medical intervention is not appropriate, unless there is a health problem or at least a potential one if the drinking pattern remains unchecked. Furthermore, Openshaw points out that combining a medical approach with the educational-psychological one is not easy. In contrast to this point of view, the medical rehabilitation of DUI offenders was considered the main aim of the Swedish interlock experiment. (See Annex 2). A 5-year long pilot BAIID programme was launched in Sweden in February, 1999. Both first and multiple DUI offenders in three counties can apply for the programme, which is administrated by county governments and organised by the Swedish National Road Administration. The main purpose of the Swedish interlock programme is to assess the rehabilitation effects of the alcohol interlock combined with medical examinations every three months. This is also the main difference between the Swedish interlock programme and interlock programmes in North America. The emphasis of the Swedish programme is on medical examinations, mainly because of Swedish legislation (Laurell et al. 2000).
In the UK, so-called ‘high-risk’ groups (repeat offenders and first-timers with BAC over 2.0 g/l) have shown greater relative improvement through attending rehabilitation courses than offenders in general.

Since 1995, DUI offenders assigned to the interlock have been under study to assess the impact of a four-part programme of supportive guidance in Alberta, Canada. The purpose of the programme is to attempt to slow the expected rate of increase in DUI re-offences, once the interlock is removed. The study sample (n = 2311) consisted of approximately 75% first-

time and 25% repeat DUI offenders. These groups were able to install the interlock after a period of violation-free suspension time. Over 5.5 million BAC tests were recorded during the programme between 1995 and 1999 (Marques et al. 2000a).

The strongest predictors of drivers recording a high rate of failed BAC tests when attempting to start their car include:

- heavier self-reported consumption of alcohol;
- having been required to have an interlock for some period prior to re-instatement of the license (e.g. imposed interlocks);
- having been assigned to more interlock required time before becoming eligible for re-instatement (this is strongly correlated with the number of prior DUI offences);
- NOT having the supportive guidance available (e.g. the contrast site);
- being single;
- having children.

(Marques et al. 2000a)

Findings show that those in cities were less likely to have fail-level BACs. Variables, which were tested but did not significantly predict more failed BAC tests include age, ethnicity, education, length of suspension, time on the interlock, and prior offences. The fail level was set at 0.4 g/l (Marques et al. 2000a).

According to the preliminary results from another study (Marques et al. 2000b), having the same supportive means as the Alberta interlock programme ('harm-reducing intervention') combined with the use of BAIID, has had positive effects on re-offence rates after the interlock period. The study sample (n = 2285) included 1537 first-time, 492 second-time and 256 multiple DUI offenders. A four-element 'harm-reducing intervention' was tested in Calgary (42% of the sample). The 'harm-reducing intervention' was not available in Edmonton, where the interlock is also in use. The model predicts that those who are exposed to this type of instructive guidance and motivational intervention, will be less likely to have repeat DUI offences compared to those who are not. The intervention occurred on monthly or bimonthly service visits. The elements of the harm-reducing intervention are as follows:

- *educational support* which covers the pragmatics of living with an interlock, helping users to avoid warns and fails, staying in the programme, avoiding the cost of further DUIs;
- *case management support* to assist in finding and using community resources relevant to various needs (family counselling, job counselling, addictions treatment);
- *motivational enhancement therapy* to enhance the sense of responsibility toward self-change and to begin movement along the change readiness continuum;
- *protective planning support* to assist in planning for activities during the high-risk post-interlock period, when the ignition will no longer be locked by high BACs (Marques et al. 2000b).

In Sweden, it will also be studied how BAIID users cope with everyday life and work. Accordingly, it is possible that the effects of BAIID are best when its use is supported by some additional means such as a) educational support, b) general motivational measures, c) family counselling, job counselling or alcohol addictions treatment, or d) supportive measures after BAIID use. Provided that these supportive means are combined with service visits, the costs will be lower and the arrangements more readily feasible.

4. REVIEW OF APPLICATION PROCEDURES

Otto Kärki (VTT) & Claudia Evers (BASt)

Studies on BAIIDs not only give information about the effect of BAIIDs on different target groups, they also provide information about specific application procedures for BAIIDs. Attention has to be paid to the issue of social acceptance of BAIIDs, to the costs of interlock devices and to the question whether a BAIID should be used only on a voluntary basis or could also be imposed by court or as an administrative measure. To conclude, national and cultural differences in regard to acceptance of interventional measures will be discussed.

4.1. Social acceptance of interlock programmes

Social acceptance is a major contributing factor to the success of alcohol ignition interlock programmes, as their implementation and performance on a considerable scale demands a sufficient number of participants to justify public investments (e.g. administrative procedures, monetary investment, possible legislative changes).

In the USA and Canada the public is strongly in favour of using BAIIDs in order to prevent DUI recidivism (Beirness et al. 2000). Most BAIID programmes are based on voluntary use of alcohol interlocks, even though mandatory use of interlocks has also strong public support in some US States. There has been some reluctance of programme administrators to insist on DUI offenders having to install an interlock as a condition of license re-instatement in Alberta, Canada.

An opinion poll about BAIIDs was carried out in Wisconsin, USA, in September, 1997. Most people of the sample (N = 600) heartily agreed that repeat DUI offenders should be required to use the interlock device, if they apply for an occupational license and for some period of time after their regular license is re-instated. Legislators had strong constituent support (86%) for requiring use of the interlock device with an occupational license and for at least one year after their license is re-instated. There was also strong support (66%) for requiring this device for first-time offenders being caught driving with a BAC of one and one half times the legal limit, or 1.5 g/l. It was also believed by 61% that all DUI offenders should be required to use the interlock device. Over half of all questioned people felt that the current temporary license revocation is not effective. Interestingly enough, only 5% of those questioned who had been convicted of a DUI offence, found license revocation to be extremely effective, yet they expressed a strong support for requiring the interlock device both as a part of the occupational license and after license re-instatement (Lifesafer.com, 2000).

From a voluntary trial programme in South Australia, overall very positive opinions of BAIIDs were reported by the volunteers, after a 6-month experience with the device (Coxon & Earl, 1998). Generally, they stated that the BAIID is a useful device as a sentencing option by courts for DUI offenders. It is notable that these results are highly biased as the participants were not a ‘real’ target group (i.e. no convicted DUI drivers, no evidence of past drink-driving behaviour) and had the possibility to switch off the device.
Despite the fact that it is too early to draw meaningful conclusions about the pilot interlock programme in Sweden, experiences with rehabilitation are positive and participants in tests are satisfied with the program. Because of the high costs of the attendance, only motivated drivers with a high need of using a car are willing to participate in the programme. Most test participants are middle-aged men. There was also a great variety of professions involved in

the test group. Reports in the media about the programme were also positive. (Laurell et al. 2000).

By the end of year 2000, about 160 drink-driving offenders participated in the pilot programme in Sweden (See Annex 2). In addition to Stockholm county, one county in the south of Sweden and one county in the north of Sweden take part in the trial (Allo, 2000a). Both first time offenders and drink-driving recidivists can apply for the programme, but drug users and mixed users are excluded from the programme in Sweden (County governments in Sweden, 1999a, 1999b). During the first year of the interlock programme about 10 % of aggravated DUI offenders participated (Bjerre & Laurell, 2000). The percentage of DUI offenders that enter the programme varies among jurisdictions. In Stockholm it is about 20%, while in the north of Sweden the percentage is higher because the need to drive is greater. In the smaller communities, where there is greater awareness of those who have been caught and therefore a stronger likelihood that those driving while suspended will be reported to the police, participation rates tend to be lower (Allo, 2000b).

The interlock has also been tested among professional drivers in Sweden. One bus company, one truck company, and one taxi company had 100 interlocks each in use in March, 2000. The interlock is used as a quality assurance tool in the companies. The interlock has been accepted well in the companies and there are no major economical hindrances in professional interlock use. Especially appropriate targets for professional interlock use are school transport and transport of dangerous substances (Laurell et al. 2000).
Despite the growing number of jurisdictions allowing interlock programmes, public opinion being in favour of BAIID programmes, and evaluation results being very promising, the low participation rate is one problem, which has plagued interlock programmes. Participation rates typically range from 1 to 4 % of all DUI offenders that are eligible for the programme (Beirness et al. 2000, Tippetts & Voas, 1997, Voas et al. 1999).

Disincentives for non-participation, i.e. the inconvenience of being unable to drive or the perceived risk of driving while unlicensed, are not sufficient to motivate participation. The cost of having the interlock installed and maintained ($1000 per year) combined with the annoyance and potential embarrassment of having to provide breath samples repeatedly would appear to be disincentives to participation (Beirness et al. 2000). Tippetts & Voas (1997) suggest that the requirement of urine analysis (possibly disclosing other drug use) might make offenders reluctant, or that offenders partly believed that they are unlikely to be apprehended if driving while suspended. Also incentives for programme participants such as license re-instatement or reduction of insurance costs were not found to have sufficient impact to motivate participation in interlock programmes (Tippetts & Voas, 1997).

4.2. Costs of the BAIID and the interlock programme

As a matter of fact, one factor contributing to low participation rates in interlock programmes is the costs of participation for the driver. First of all, there are monetary investments by the participant for installation of the BAIID into the vehicle and a regular amount to be paid for maintenance. In the currently running Swedish pilot project, total costs for participation are about 4,500 euro within a 2-year period. Willingness to have an alcohol interlock to use on a voluntary basis and pay the costs of interlock use differs from 1% to 20% among DUI offenders (Beirness et al. 2000; Bjerre & Laurell, 2000; Tippets & Voas, 1998).
These relatively high costs are a barrier for (programme eligible) DUI offenders to participate in an interlock programme, as e.g. the Swedish pilot trial indicates. In Sweden, about 60% of eligible DUI drivers, who did not participate in the interlock programme, considered that the

BAIID is too expensive. Nonetheless, only 20% would have participated if the costs were 50% lower, but as many as 60% would, if it had been free (Bjerre & Laurell, 2000).

Besides monetary cost, additional 'investments' are required from the participant: regular medical checks and service checks may be demanded and participants have to undergo training in how to handle the BAIID. Thus, required time and (physical) effort may cause inconvenience and reluctance. Surprisingly, the medical requirements were only considered by a few eligible non-participants in Sweden as too strict to cope with (Bjerre & Laurell, 2000). However, other authors suggest that the requirement of urine analysis (possibly disclosing other drug use) might make offenders reluctant, and might therefore foil participation (Tippetts & Voas, 1997).

If a driver is willing to pay all the cost and accept the inconvenience resulting from the interlock programme, this may reflect a high desire of having a valid license (Dussault & Gendreau, 2000), thus leading to a self-selected and motivated participant group. This is positive for programme success, but simultaneously means, that the most problematic DUI offenders are not reached. In the Swedish trial, only a few eligible non-participants considered the revocation of their license to be of minor importance (Bjerre & Laurell, 2000), but neither the importance of being mobile, nor incentives such as insurance cost reduction (Tippetts & Voas, 1997) seem a sufficient motivation for participation in an interlock programme. If so, other models of refinancing participation costs are also likely to be of limited effectiveness to increase participation rates, e.g. a 'fine offset programme' meaning that fines paid by the offender could be used to offset the costs for participation in the interlock programme (Coxon, 1999).

4.3. Voluntary versus mandatory participation

Most of the current interlock programmes are based on voluntary participation. However, to increase participation rates some jurisdictions made interlock installation a condition for license re-instatement, e.g. the Alberta interlock programme allows both mandatory and voluntary participation. Presently, the ratio of voluntary vs. mandatory participants is 6 to 1 in Alberta (Beirness et al. 2000).

DUI offenders can volunteer for the programme in Alberta as a means to obtain a reduction in the length of hard suspension. To volunteer for the interlock programme, eligible offenders must have served a minimum period of licence suspension (at least three months) and have completed all other conditions of re-instatement (all fines, fees and education/rehabilitation programmes) before applying (Beirness et al. 2000). In some states in the US, the waiting period before interlock probation can be as long as two years (Table 6), (Popkin et al. 1993, Fisher, Turner & Wynkoop 2000).

In Alberta, DUI offenders can also be ordered by the Driver Control Board to have an interlock installed as a condition of re-instatement. A minimum period of suspension (at least six months) must have been served and all other conditions of re-instatement fulfilled. For repeat offenders this includes completion of the weekend-long assessment and referral programme known as IMPACT (Beirness et al. 2000).

Experience in Alberta indicates that drink-driving recidivists are the best target group for mandatory use of BAIIDs. Interlocks can be used on a voluntary basis also by first-time offenders. The minimum interlock period in Alberta is six months or until the end of the original period of suspension. The suspension can be reduced by voluntary interlock use only.

In voluntary BAIID programmes, recidivism rates after interlock removal have been slightly lower in Canada than in the US. According to the Alberta research, increased use of mandatory participation in interlock programmes will not have a detrimental impact on the overall success of the programme (Beirness et al. 2000).

Voluntary participants differ from mandatory ones in a number of ways. Being mandated to the programme resulted in fewer trips in the BAIID equipped vehicle and more fail trips (Voas et al. 2000). Additionally, mandatory participants were found to be slightly older than the voluntary group, typically serving a longer period of hard suspension prior to re-instatement, more likely to be male and to have a prior DUI conviction (Beirness et al., 2000). In a nutshell, mandatory participation seems to be connected with more serious drinking (-and-driving) problems and less motivation for the programme (Voas et al. 2000).

In a voluntary interlock trial in Colorado, USA, the legislature has authorised limited driving privileges for persons previously denied them on grounds of alcohol-related revocations. The statute still requires that these drivers serve a minimum period of revocation with no driving allowed, depending on their past convictions for DUI. Any driver who was revoked for alcohol-related violations can apply for a hearing, if he or she has paid all fines and court costs and was more than 18 years old at the time of the violation. At the hearing, applications for probationary driving privileges are reviewed and either approved or denied. Persons convicted for traffic offences received after revocation do not qualify for this programme. Applying and qualifying for a hearing does not guarantee approval under this programme. A hearing will be conducted to judge the merits and suitability of each applicant (Fisher, Turner & Wynkoop, 2000).

The screening and evaluation of DUI offenders in Colorado include considerations of such factors as previous compliance with motor vehicle laws, compliance with court appearances and rulings, and prior completion of or enrolment in an alcohol treatment programme. The cost of interlock use to the user is roughly $2 per day depending on the length of time for which the probationary licence is authorised. A person whose probationary license is cancelled under this programme is subject to the extended period of restraint without a driving privilege. For this reason some drivers may not wish to participate (Fisher, Turner & Wynkoop, 2000).

However, both voluntary and mandatory interlock programme groups are biased and self-selected. Although self-selection is likely to be higher in voluntary programmes, mandatory groups are also selective: only those who followed the order to have an interlock installed are included in the programme. Often, the number of offenders who were ordered to use a BAIID, but refused, is not known (e.g. Beirness et al., 2000). Even a mandatory programme cannot reach all programme eligible DUI drivers; those who find the programme absolutely unacceptable, will refuse participation anyway.

4.4. Juridical versus administrative interlock programmes

In juridical interlock programmes, which are the majority of US interlock programmes, interlock usage is court-administered. Interlocks are primarily seen as a sentencing tool, i.e. the punitive character of interlock programmes and their specific deterrence are emphasised rather than rehabilitation. In these programmes, the term of interlock use is invariably of fixed duration. Furthermore, the length reflects the perceived seriousness of the crime and monitoring and supervision of offenders tends to be limited and perfunctory (Comeau & Marples, 1997).

In administrative interlock programmes which are administered by licensing authorities (in nine states of the US (and in Alberta and Quebec, Canada), the emphasis is more on

rehabilitation than on sanction. The underlying premise is that ‘‘driving is a privilege which citizens have a right to be expected to exercise in a manner consistent with public safety” Comeau & Marples, 1997, p. 211). Duration of such programmes is flexible. Thus, ignition interlocks in administrative programmes are viewed as an aid to assessment and rehabilitation, giving the problem driver the opportunity to change his/her drinking-and-driving behaviour.

4.5. Accompanying measures

It can be assumed that the combination of interlock usage and simultaneous participation in educational/psychological programmes has a higher effect on motivation than the mere technical intervention of BAIID usage. For example, 50% less repeat DUI offences after interlock removal (12-month period) were found in interlock offenders who were submitted to adjunctive motivational intervention in an interlock programme in Calgary. This finding, reported in May 2000, was based on an initial sample of 1373 first offenders. Yet, since they showed low re-offence rates, 1.2% with intervention and 2.4% without, the results are not significant (Marques et al. 2000b).

4.6. National and cultural differences

From a social perspective, acceptance of an interventional measure (e.g. sanctions, restrictions, educational programmes, and campaigns) depends on the common problem awareness. On average, 85% of the European drivers see drinking-and-driving as being the most important human factor contributing to accidents, and more than 40% of European drivers favour an alcohol ban on the roads with much support in Sweden, the Netherlands, Finland and the UK (SARTRE 2, 1998). These results indicate a considerable awareness of the drinking-and-driving problem in Europe.

From a pan-national perspective, differences in driving and drinking habits between various countries have to be recognised, since they influence social acceptance of safety measures. Drinking habits within Europe vary considerably: The usual description of consumption patterns of southern, wine producing countries (frequent, but moderate consumption) versus Nordic countries (infrequent, but intensive consumption) could partly be verified in SARTRE 2 (1998; c.f. also Christ & Brandstätter, 1998). Additionally, a large variation in the tolerance of North and South European drivers as regards freedom in drinking-and-driving was found. Drivers of southern European countries (e.g. Greece, Italy, Portugal, France, Spain) are, less extreme in their disapproval of freedom in drinking-and-driving, but simultaneously very extreme in thinking that drinking-and-driving is a main accident cause and should be forbidden for young drivers. This might indicate, that southern European drivers tend to see the problem of drinking-and-driving as a particular problem of certain road user groups (e.g. young drivers, drivers with anti-social tendencies), and to equate drinking-and-driving with ‘drunk driving’ and ‘reckless, uncontrolled driving’. In contrast, in northern countries (like Finland, Sweden, Netherlands, UK) drinking-and-driving is rather considered as a general social phenomenon and seen as driving with a BAC over the legal limit. These findings seem to be stable over time, as they are in line with earlier results from the first SARTRE study (SARTRE, 1994). Generally, lower legal alcohol limits correspond to the awareness of alcohol risks in traffic and to desirable habits regarding drinking-and-driving. The assumption, that differences in attitudes towards drinking and drinking-and-driving result mainly from socio-demographically differing driver populations in the various countries, could not be verified (Christ & Brandstätter, 1998). Thus, cultural differences indeed seem to be the main contributing factor for different attitudes in European countries.

Results on social acceptance of technical devices to prevent drinking-and-driving show a somewhat varying picture. In the survey on attitude and behaviour of European car drivers to road safety (SARTRE 2,1998), 46% of the European drivers, on average, considered an alcohol-meter as a personal very/fairly useful in-car device. However, alcohol-meters come last but one in estimated personal usefulness, compared to other in-car devices (only mobile phones were estimated less useful with 38%). Greek, French and Portuguese drivers considered the alcohol-meter to test their breath alcohol concentration as useful for themselves. This result is surprising as these countries showed to have a more liberal attitude towards personal freedom in drinking-and-driving compared to the northern countries. Dutch drivers tend not to see any or much personal usefulness in alcohol-meters. The Swedish, who share the restrictive attitude towards personal freedom with the Dutch, also share enthusiasm for alcohol-meters with the southern countries. An explanation for this contradiction might be that drivers who do not see any personal usefulness in alcohol-meters, do not think they need this device as they rely on self-control to avoid drinking-and-driving.

About 22% of European drivers support alcohol-meters in cars as a means of enforcement ‘very much’, 24% support such devices ‘fairly much’. A lot of support could be found in Slovenia, Greece, France, Sweden, Ireland, and Poland. Strong rejection was found in the Netherlands, Germany, Austria, and the Czech Republic; half or more of the drivers were against these devices (SARTRE 2, 1998). One assumption to explain these national differences is that the chance of being breathalised is low in countries with high rejection rates. Additionally, as for estimated personal usefulness, there might be rejection because self-control is seen as more adequate to avoid drinking-and-driving.

5. CONCLUSIONS AND RECOMMENDATIONS FOR AN EU INTERLOCK TRIAL, BASED ON LITERATURE REVIEW

Otto Kärki (VTT) & Claudia Evers (BASt)

5.1. Countries with interlock experience

The literature review shows that 42 states in the US and five Canadian jurisdictions have legislation to order interlock devices in the vehicles of DUI offenders. However, not all jurisdictions with legislation are currently operating interlock programmes (Beirness, 2001a). Evaluations of interlock programmes of Maryland, West Virginia, North Carolina, and Colorado in US as well as an acceptance study from Wisconsin were included in this study. Evaluations of Canadian interlock programmes from Alberta and Quebec were included. A pilot interlock programme started in three counties of Sweden in February, 1999 and some preliminary evaluations of the Swedish pilot programme are included in this study. The interlock has also been experimented in professional transport in Sweden. A voluntary based interlock programme has been experimented with in South Australia.

5.2. Target groups and effectiveness per group

According to the literature review, prospective target groups of an EU alcohol ignition interlock field trial would be:

a) *DUI recidivists*: Most appropriate group for using the interlocks. Especially drivers who commit another DUI offence, before completing the minimum period of hard suspension should have an interlock installed in their vehicles, even if they were not legally allowed to drive for a period of time. It is probable that this group continues drink-driving even when their licence is suspended. Effectiveness: BAIID use reduced the number of repeat DUI offences, while installed, by 28–65% (Voas et al. 1999). After removal, re-offence rates tend to return to pre-interlock levels.
b) *First-time high BAC offenders (Aggravated DUI offenders)*: An appropriate good group for interlock use. Effectiveness: the interlock, while installed, reduced repeat DUI offences of this group even more than repeat DUI offences of DUI recidivists. Provided that interlocks can be installed in large numbers, the interlock can be aimed at relatively low risk first-time DUI offenders also as a preventive measure.
c) A group whose dependence on alcohol is estimated medically (no DUI offences, problems with alcohol, willing to drive). These people may have difficulties showing that they are not dependent on alcohol. Their participation must not violate the EC council directive (91/439/EEC).
d) *Professional drivers*: The interlock could be tested in specially tailored targets like school transport and transport of dangerous goods. Sweden already has some experience with interlock use in professional transport.

5.3. Selection and screening of potential users

The effects of use of the interlock on DUI re-offence rates should not solely be the major subject researched in the EU field trials. Many research results from the USA and Canada have clearly shown the effect of the interlocks in reducing DUI recidivism while installed, even though only one study (Beck et al. 1999) was based on random screening of interlock users. Emphasis in the EU should also be on implementing the interlock (or an electronic driving licence) in large numbers for DUI recidivists and combining interlock use with some rehabilitation. This goal should be set after a field trial, which can probably be set up in a few countries only. Because participation rates in voluntary interlock programmes have been low, feasibility of mandatory interlock use should also be considered. The potential of the interlock in reducing DUI while installed is clear. The goal should be reduction of DUI recidivism also after interlock removal.

The field experiment should be arranged in a way that makes it possible to identify combined effects of BAIID and rehabilitation. Thus the experiment should have separate groups comprising drivers with BAIID only, and drivers having both the BAIID and a rehabilitation programme (medical and/or psychological). There is no need to choose BAIID users according to gender, age, income, residence or profession. However, some attention should be paid to first-time DUI offenders in addition to DUI recidivists. Previous traffic violations other than DUI offences should perhaps also be considered as an eligibility factor for BAIID users.

5.4. Application procedures

There are several alternatives for setting the **BAC threshold** (fail level) for interlock use in the EU. One is 0.5 g/l, which is the legal limit in most EU countries. The other BAC threshold values supported in EU countries are 0, 0.1, 0.2 and 0.3 g/l. The evidence in favour of the 0.5 BAC threshold is the acceleration of accident risk increase above this threshold. According to national legal limits the BAC thresholds would vary from 0.2 g/l to 0.8 g/l. The 0.8 BAC threshold combined with a potential calibration tolerance would be far too high. If the interlock is to be a tool for helping to teach sober driving, 0.2 g/l or even 0 would be appropriate BAC thresholds. In BAIID programmes combined with rehabilitation, 0.2 g/l or even 0 g/l BAC thresholds would be the best alternatives. Because of some social drinking and possibility for false alarms caused by food containing alcohol 0.2 g/l would be better than 0. To conclude, we would recommend the *0.2 g/l BAC threshold as the best alternative* for field trials of the interlocks in the EU.

There are some **medical procedures** which should be included in the EU BAIID programme. A certificate from a specialist physician should be attached to the application form. Whether someone with a history of drug or mixed use is capable of attending an interlock programme in the EU, should be judged nationally, because of the variation in legislation and attitudes to drug use in EU countries. However, it is recommended that drug dependent persons would be excluded from the BAIID programme in the EU.

The user of the interlock is usually responsible for almost all **the costs of using the device**. Some cost subvention of rehabilitation is recommended in order to make use of the interlock more attractive. In Sweden it was presumed, however, that any economical subvention for drink-drivers would upset the public. Another incentive could be to shorten the driving suspension through voluntary participation in a BAIID programme. This incentive is used in Alberta, Canada, and is recommended only in countries with long driving suspension because of DUI.

5.5. Other countermeasures with interlock

There are some problems in implementing medical rehabilitation in field trials of alcohol interlocks in the EU, such as variations in the driving suspension period. As already stated, it is recommended that some kind of rehabilitation be combined with use of the alcohol interlock to reduce drink-driving recidivism, also after the interlock period. At least psychological intervention is recommended for field trials in the EU; complete medical intervention is not, because combining a medical approach with the educational-psychological one is not easy. Yet, the form of medical rehabilitation should still be considered, and the experiences from Sweden utilised. It is possible that the best results would be achieved by regular rehabilitation intervention during the BAIID period and by having some requirements at the end of the programme. However, cost of the rehabilitation should not be a disincentive for participation. One possibility in EU field trials would be to compare a group having both BAIID and complete medical intervention with a group having BAIID and psychological intervention or BAIID alone.

In countries with relatively short driving suspension periods for DUI offences, it is difficult to have enough time for rehabilitation, if the longest possible interlock installation time is one year (willingness to pay the costs of interlock use). Before the interlock period a minimum period of hard suspension has been usually required in Canada and the US, not in Sweden. Research and experience from Canada also suggest that the ideal duration of participation in an interlock programme should depend on performance of the individual in the programme (Marques et al. 2000a, Beirness, 2001a).

Accordingly, there are two possibilities in countries with *short driving suspension periods* for DUI offences: 1) No driving suspension at all before the interlock period and some rehabilitation during the interlock period; 2) Three months driving suspension before the interlock period combined with intensive rehabilitation. In countries with *an average driving suspension period for DUI of over twelve months*, the recommended interlock installation time can be longer, for example 24 months as in Sweden. In countries having relatively long driving suspension periods for DUI offences, rehabilitation can be given at regular intervals during the interlock period. Another possibility is to give rehabilitation before the interlock period. A better alternative, however, is to set some rehabilitation requirements at the end of the interlock period, as in the Swedish model, in order to maintain the combined effects of rehabilitation and interlock use, following interlock removal. An option for the extended interlock period or interlock period depending on performance of the individual during the programme should be considered nationally. To conclude, the effects on participation and recidivism rates in BAIID trials in the EU could be compared in EU countries having a hard suspension requirement and countries not having that requirement, and possibly also with and without rehabilitation.

Results from the rehabilitation programmes in the USA indicate that repeat offenders and aggravated first-time DUI offenders would benefit most from rehabilitation combined with the use of an interlock. Some studies also indicate that rehabilitation is more successful among *novice drivers* who have low BAC levels. The biggest obstacle to implementing interlocks for novice drivers is the costs involved. Larger compensation for novice first-time DUI offenders could be a good alternative if interlock use were made available to this group also. First-time DUI offenders with low BAC levels are not the major risk group in drink-driving. The focus should be on high-risk groups, for whom the effectiveness of the interlock (and rehabilitation) is better.

If rehabilitation is not included in the BAIID programme, clear national/EU-wide effects on DUI offences and traffic safety can be achieved only if interlocks are installed in large numbers. On a voluntary basis 1-20% of DUI offenders would voluntarily pay for the use of an interlock. In contrast to low voluntary participation rates BAIID use has strong public support. To enable the use of the interlocks in large numbers the possibility of mandatory interlock use could also be envisaged after a regional/national programme has been in place for some time. However, there is no statistically significant evidence that mandatory interlock use would reduce DUI recidivism more than voluntary use. Furthermore, mandatory interlock use may require a change of legislation in many countries. Accordingly, a two-step implementation of alcohol interlocks in EU is recommended:

1) BAIID implementation on a voluntary basis combined with evaluation of the programme effects, including effects of rehabilitation and
2) Evaluation of the trial programme, after a decision is to be made whether mandatory BAIID use should be imposed on certain DUI offenders or under certain conditions. The decision on the option of mandatory BAIID use should be a national decision.

5.6. Social acceptance of interlock programmes

Results of the acceptance studies show a discrepancy between considerable public acceptance of interlock programmes and the fact that only a minority of convicted DUI offenders actually take part in BAIID programmes. Some reasons and possible approaches to increase participation are described in the following paragraphs.

Obviously, the perceived disadvantages (costs, reluctance, embarrassment etc.) of using a BAIID are so strong, that it is difficult to motivate participation by cost reduction only. Alternative sanctions are preferable, for they may be less or equally expensive and/or demand less effort from the participant.

One possibility to increase attractiveness is to adapt participation costs to the costs for alternative sanctions. Ways for realisation could be subsidy, lower monthly rates for the participant in a longer time period (possibly exceeding the programme duration) etc. Alternative ways of financing interlock programmes are to be discussed in more detail. The programme itself could probably be made attractive by making conditions transparent and easy to understand. Furthermore, good access to service points for training, maintenance, medical checks etc. should be guaranteed to decrease reluctance. An accompanying information campaign to promote the measure is recommended as well, especially when an interlock programme has just been implemented. Information on the programme should explain the conditions and procedures of participation in a positive way, i.e. the ‘gains’ for the participant should be pointed out (e.g. being mobile, shorter suspension periods etc.).

From the perspective of acceptance it is recommended to implement an interlock programme on voluntary basis – at least in the beginning of a regional/national programme. A mandatory programme can be expected to give rise to more resentments.

Administrative programmes can be considered as more remedial, as they are more flexible than juridical programmes, taking into account individual circumstances and changing conditions. Anyway, they are more recommendable in terms of acceptance than juridical programmes. However, it is important that programme eligible drivers are aware of this approach. This means, the concept of administrative programmes emphasising support and individuality must be promoted and ‘lived’ by the programme provider. Ideal approaches would be e.g.: individual and detailed advice for programme applicants, a flexible programme conception suitable for individual circumstances and accessible accompanying human services. Additionally, during the programme, individual developments regarding drinking-and-driving behaviour should be monitored and the programme process (e.g. duration,

additional measures etc.) should be adapted accordingly. How a flexible approach can be implemented and carried out with affordable effort is to be discussed in detail. In terms of success and motivation, accompanying educational/psychological measures seem an important factor and consequently can be expected to contribute to acceptance in a positive way.

With respect to national and cultural differences in social acceptance of interlocks, it is notable that the SARTRE data is based on self-reports and thus likely to be biased (e.g. social desirability). However, they give a vivid picture of socio-cultural differences on drinking-and-driving issues. Although interpreters must be cautious, these results seem to indicate that in some countries (Germany, Austria, and the Netherlands) more convincing efforts will have to be made to increase acceptance of interlock programmes than in other countries.

6. LEGAL REQUIREMENTS IN CONNECTION WITH INTERLOCKS

Claudia Evers (BASt)

The introduction of BAIIDs and interlock programmes involves a number of serious legal questions that should be examined and taken into consideration as a legal environment is required which permits and supports this measure. The following chapter gives an overview about general legal aspects to be taken into account for a possible introduction of interlocks.

One purpose of this feasibility study is to examine the main relevant legal provisions in eleven European countries, which have not yet implemented interlock programmes ('inexperienced' countries). For this purpose, a questionnaire was submitted to organisations and institutes dealing with legal issues in road traffic (see Annex 5). Additionally, thirteen experts of four countries already having experience with alcohol interlock programmes for DUI offenders (Australia, Canada, Sweden, USA) were questioned by a similar survey to receive more detailed information on (legal) frame conditions for running interlock programmes (see Annex 6). The persons/organisations to respond to the questionnaire were chosen on the basis of personal contact between the project members of the feasibility study and the respondents. Both questionnaires, the names and organisation of those who filled in the questionnaire are attached to this report (Annexes 5, 6, and 7).

6.1. Survey in European countries

Ten of the eleven 'inexperienced' countries returned the completed questionnaire (Annex 5). The following results are based on answers from Austria (A), Belgium (B), Czech Republic (CZ), Denmark (DK), Finland (FIN), France (F), Germany (D), Spain (E), the Netherlands (NL) and United Kingdom (UK). No answers were received from Greece (see Annex 7). *It is worth noticing that although the questionnaire asked for official attitudes, it is not possible to establish whether the answers reflect the official national position of the countries. However, the country names in the following paragraphs are used for reasons of simplification.*

National BAC limits and sanctions
Most countries questioned have already introduced a legal BAC (blood alcohol concentration) limit of 0.5 g/l valid for private drivers (license class B) after a probationary period. Exceptions are the Czech Republic with a 0 BAC limit and UK with a higher legal BAC limit of 0.8 g/l. Some countries additionally provide BAC levels for specific target groups: In Austria and Spain, the legal BAC limit for novice drivers within the first two years is 0.1 g/l, respectively 0.3 g/l. For Spain, the 0.3 g/l limit is also valid for professional drivers of goods and persons. Belgium has a BAC limit of 0.8 g/l in the exceptional case a blood sample is taken (e.g. if the driver is medically unable to provide a breath sample).
The severity of sanctions for drinking-and-driving offences usually varies according to the severity of the offence, i.e. the BAC level, the danger or damage caused (e.g. accident involvement), and the number of previous offences. All countries have a wide range of possible sanctions ranging from fines, driving bans or license suspension to imprisonment. The following table (Table 6.1) gives an overview of legal BAC and BrAC (breath alcohol concentration) limits, sanctions, and conditions for license re-instatement, based on the questionnaire data and additional information by the project members of this project (for their own country, i.e. D, DK, FIN, NL). The national system of sanctions for DUI offences

presents a significant background for a possible implementation of BAIIDs, as this 'new' sanction would have to fit into the traditionally established system of intervention measures.

Table 6.1. *Overview on legal limits, sanctions and conditions for license re-instatement in the European countries integrated in the survey.*

Country	BAC limit (g/l)[1]	BrAC limit (mg/l)[1]	Sanctions	Conditions for driving license re-instatement
A	**0.5**	**0.25**	**0.5 – 0.79 BAC:** fine, from 2nd offence on: license withdrawal (min. 3 weeks) **0.8 – 1.19 BAC:** fine, license withdrawal (min. 4 weeks for 1st offence) **1.2 – 1.59 BAC:** fine, license withdrawal (min. 3 months for 1st offence), driver improvement **1.6 or more BAC:** fine, license withdrawal (min. 4 months for 1st offence), medical psychological report fines are up to 80,000 ATS (€5813)	Attendant measures to change the attitude of the driver (driver improvement) **0.5 – 1.19 BAC:** optional order **1.2 – 1.59 BAC:** obligatory order **1.6 or more BAC:** obligatory order + examination by the medical officer + psychological examination
B	**0.5**	**0.22**	**0.22 – 0.34 BrAC:** settlement of court (SOC) (5,000 BEF), driving ban (3 hours); prosecution if SOC is not paid; penalty: fine (5,000 – 100,000 BEF) (€123 - €2478) **0.35 – 0.49 BrAC:** SOC[2] (15,000 BEF), driving ban (6 hours min.), license withdrawal (15 days) if unsafe driving behaviour; prosecution if SOC is not paid/unsafe driving behaviour/accident with injury; penalty: fine (40,000 – 400,000 BEF) (€991 - €9915) and/or imprisonment (15 days – 6 months), license suspension (8 days – 5 years) **0.50 – 0.64 BrAC:** SOC[2] (20,000 BEF) (further sanctions (as above) **0.65 and more BrAC, impairment:** license withdrawal (if unsafe driving behaviour; always in case of BrAC of 0.7 mg/l or more and impairment), prosecution, penalty (as above) refusal of breath test / breath analysis / blood test: SOC (25,000 BEF) (€619), further sanctions (see 0.35 – 0.49 BrAC)	For drivers under the age of 25, rehabilitation programme is possible when committing a DUI offence with a BrAC of 0.35 - 0.64 mg/l (SOC imposed) or refusal of breath test / breath analysis / blood test If penalties were imposed, probation (e.g. rehabilitation programme) is possible
CZ	**0.0**	**0.00**	fine, confiscation of driving license, prosecution (no corresponding BAC levels specified)	Repetition of the examination, re-education, medical control and evaluation

[1] Limits for license class B and after probationary period.
[2] SOC does not apply in case of unsafe behaviour in traffic or accident with injury.

Country	BAC limit (g/l)[1]	BrAC limit (mg/l)[1]	Sanctions	Conditions for driving license re-instatement
D	**0.5**	**0.25**	**0.3 – 0.49 BAC (only in case of an accident or odd driving behaviour):** fine, license withdrawal, imprisonment up to 5 years (depending on severity) **0.5 – 1.09 BAC:** fine (min. 500 DM) (€255), driving ban (min. 1 month), 4 penalty points **1.1 – 1.59 BAC:** fine or imprisonment, license withdrawal (6 months – 5 years), 7 penalty points **1.6 or more BAC:** fine or imprisonment, license withdrawal (up to 5 years), 7 penalty points, medical-psychological expert opinion	For alcohol dependent offenders: medical expert opinion; abuse of alcohol/ BAC of 1.6 or more/repeat DUI offence: medical-psychological expert opinion (possible outcome: recommendation for driver improvement)
DK	**0.5**	**N.A.**	**0.51 – 0.8 BAC:** License suspension (under aggravating circumstances) and fine (1st and 2nd offence) or imprisonment (min.10 days) **0.81 – 1.2 BAC:** License suspension (1st offence without aggravating circumstances) or withdrawal (min.1 year) and fine (1st offence) or imprisonment (min.10 days) **1.21 – 1.5 BAC:** License withdrawal (min.1 year) and fine (1st offence) or imprisonment (min.10 days) **1.51 – 2.0 BAC.** License withdrawal (min. 2 years) and fine (1st offence without aggravating circumstances) or imprisonment (min.14 days) **2.01 – 2.5 BAC**: License withdrawal (min. 2½ years) and imprisonment (min. 14 days) **2.51 and more BAC:** License withdrawal (min. 2½ years) and imprisonment (min. 20 days)	New driving test required both in case of license suspension and licence withdrawal
E	**0.5**	**0.25**	Drunk driving is treated as a 'most serious offence': fine up to €601 and license suspension for 3 months. Drink-driving offences may also be treated under criminal law: Penal sanction in case of a positive result of evidential breath test and when the judge decides that it was impairing the driver's behaviour. Possible sanctions: arrest (8 - 12 weekends), fine (equivalent to the driver salary of 3 - 8 months), license withdrawal (1 – 4 years) (no corresponding BAC levels specified)	If license was suspended under criminal law, the driver regains it directly after the suspension period has expired. To re-instate the license after an administrative suspension, the driver has to undertake a psychophysical test in order to prove that (s)he meets the requirements in question.

Country	BAC limit (g/l)[1]	BrAC limit (mg/l)[1]	Sanctions	Conditions for driving license re-instatement
F	**0.5**	**0.25**	**0.5 – 0.8 BAC:** fine (up to 900 FF) (€137), 3 demerit points (of a total of 12) **0.8 or more BAC:** fine (up to 30,000 FF; up to 60,000 FF for repeated offence) (€4,573 - €60,000), license suspension, 6 demerit points (in case of accident or repeated offence: 8 points), imprisonment (up to 2 years)	0.8 BAC or more / license revocation: medical examination required
FIN	**0.5**	**0.25**	1. Criminal law: Fines or prison sentence a) limit: fines or imprisonment up to 6 months; b) aggravated case (BAC > 1.2): min. 60 day-fines or imprisonment up to 2 years 2. Traffic law: driving bans ordered a) legal procedure: consequences ordered by the court in the cases mentioned under 1 a) and 1 b): driving ban up to 5 years; the normal practise: as above b) administrative procedure: consequences ordered usually on the spot by the police when the driver is guilty of drunken driving; driving ban up to 6 months Lengths of driving suspensions in practice: DUI (BAC > 0.5) average 5 months; DUI aggravated cases (BAC > 1.2) average 8 months.	After 2nd drink-driving offence: certificate of not being dependent on alcohol required from a specialist doctor. A similar certificate is required in the case of novice drivers after the 1st drink-driving offence. According to the law, the license is re-instated after the driving ban has expired. Administrative directions are applied when a certificate of a medical doctor is required due to drink-driving as above mentioned.
NL	**0.5**	**0.22**	Drink-driving is a criminal offence from a BAC of 0.54 on. Sanctions are imposed according to a system of penalty points, each point representing a fine of Hfl. 50, (€22) **0.54 – 0.8 BAC:** 10 penalty points **0.81 – 1.5 BAC:** 10 penalty points + 0.3957 penalty point per 0.01 g/l > 0.8 g/l BAC **above 1.5 BAC:** 10 penalty points + 0.1478 penalty point per 0.01 g/l > 1.5 g/l BAC For drinking bus and lorry drivers, for recidivists, and for drivers who have endangered road safety, the number of penalty points, resulting from the BAC, may be increased by 10-50%. If the number of penalty points exceeds 30, the public prosecutor, on top of the fines, will request:	If the license was suspended under criminal law, it will be automatically re-instated after the suspension period has expired. If the license was revoked under administrative law, re-instatement requires a medical examination, stating fitness to drive.

Country	BAC limit (g/l)[1]	BrAC limit (mg/l)[1]	Sanctions	Conditions for driving license re-instatement
			• probationary license suspension (between 31 and 35 penalty points); • license suspension (between 36 and 50 penalty points); • imprisonment + license suspension (> 50 penalty points). Under administrative law, a rehabilitation programme or a medical examination of fitness to drive can be imposed. As a result of the medical examination, a driver's license may be revoked.	
UK	**0.8**	**0.35**	Maximum fine = £5000; maximum prison sentence = 6 months; disqualified from driving for a min. of 1 year (no corresponding BAC levels specified)	There is a requirement on the 2nd offence, (and subsequent offences) or when the offender has a BAC of 2.0 or more, to have a medical examination before license re-instatement.

National developments regarding alcohol ignition interlocks

None of the ten countries actually uses technological devices against drink-driving offences (e.g. interlocks, electronic driving licenses). However, four countries (E, F, FIN, UK) consider the implementation of alcohol interlocks on the basis of a field or pilot trial. In Finland, a national feasibility study of alcohol interlocks is conducted. France will soon start an experiment with interlocks in two French departments with the modalities of the trial being currently under discussion. In the UK, the Department of Environment, Transport and the Regions will commission a major research project in 2001 to demonstrate the feasibility of interlock devices as a means of combating repeat drink-driving offences. More detailed information on the planned pilots of these countries is presented in Annex 8.

Highest acceptable BAIID fail level

Opinions on the highest acceptable BrAC or BAC level for calibrating the interlock (i.e. fail level) are heterogeneous, reaching from a zero limit (UK, NL) to the legal BAC limit allowed in the particular country (A, F, FIN). Czech Republic also favours the legal limit for calibration, where it is notable that this is 0 g/l. From Germany[3], a fail level of 0.3 g/l BAC was suggested, as in this country sanctions are imposed at this threshold when involved in an accident or showing odd driving behaviour (see Table 6.1). Finland can also imagine a lower fail level of 0.2 g/l BAC as recommended by the Traffic Security Board. Belgium favours two fail levels for different driver groups: For alcoholics, there should be a factual zero level (to allow some measurement tolerance, the BAIID should be calibrated at a 0.2 g/l BAC limit); for the group of non-alcoholics, the legal limit is proposed. It is notable, that a BAIID always measures BrAC values. All BAC levels mentioned in the context of BAIID measurements are an equivalent for the BAIID measured BrAC.

Integration of interlock programmes and other existing sanctions for DUI

Five countries (B, D[3], FIN, F, NL) envisage that interlock use could **replace** a license withdrawal/suspension or an unconditional driving ban, or could shorten the suspension

[3] For Germany, this statement gives the opinion of the respondent (Dräger) and does not necessarily reflect the official position of the Federal German Ministry of Transport, Building and Housing.

period. Interlock usage could be linked with a conditional driving ban, which could be enforced when the obligation to drive an interlock equipped vehicle is violated. Three countries do not believe that interlocks can replace existing sanctions (A, CZ and UK), and two countries (DK, E) did not answer the question.

There is wide agreement that an interlock could **accompany** existing sanctions. It could be implemented in addition to driver rehabilitation measures (A, B, D[3], and UK), or to fines, license withdrawal and imprisonment (B, CZ, D[3], FIN, F, and NL). Two countries (DK, E) did not answer the question. The answers reflect that interlocks are assumed to be integrated parallel to the existing system of sanctions without problems. Only the Czech Republic states that interlocks as an accompanying measure are not defined by Czech law.

Responsibilities within interlock programmes

Regarding the **selection** of programme eligible drivers, there is common agreement that this should be done by authorities responsible for licensing and ordering sanctions/rehabilitation measures (e.g. licensing authorities, courts/prosecutors). For Belgium, it is proposed that the selection process be done by the Belgian Road Safety Institute. UK proposes to make a decision on the selection of drivers after consultation between the court, the rehabilitation course organiser and the offender or his/her representative**. *Imposing interlock use*** (only valid for mandatory programmes) should be the responsibility of authorities ordering sanctions/rehabilitation measures (courts/prosecutors, licensing authorities). Finland states that new legislation would be required to empower authorities to oblige a driver to use an interlock. It was proposed that **Monitoring and enforcing** the driver's (non-)compliance with the interlock programme requirements be done by licensing authorities, authorities ordering rehabilitation measures, organisations carrying out rehabilitation measures or district courts/justice departments. Additionally, enforcement by police and checks by technical inspection agencies for cars are suggested. **Analysis and processing of the recorded data** of the interlock should be done by licensing authorities, organisations carrying out rehabilitation measures or traffic police specialists. Also traffic research or road safety institutes are suggested for this task. **Storing and using the recorded data** for evidence purposes should be the responsibility of the driving license registers, licensing authorities, organisations carrying out rehabilitation measures, traffic research centres, administrative bodies of the state/the regions or the public prosecutor. **Imposing sanctions,** if a driver joining an interlock programme does not comply with the programme requirements, is seen as the responsibility of legally empowered authorities (courts/prosecutors, licensing authorities, administrative bodies of the state/the regions, probation commission). By Germany[3], it is proposed that organisations responsible for medical-psychological expert opinions and driver improvement courses (TÜV) should be in charge of imposing sanctions[4]

Suitable target groups

The questionnaire asked for which target groups voluntary and mandatory interlock use would be sensible. The responses of those countries that answered these questions are listed in Table 6.2 and 6.3.

In a nutshell, a distinction can be made between a general versus a specific preventive approach. Although propositions for suitable target groups vary widely and interpretation has to be tentative, the emphasis for voluntary interlock programmes is more on general prevention. The most 'open' approach is that voluntary interlock use is recommended for everybody. As a measure of specific prevention, voluntary interlocks are recommended mainly for first DUI offenders with a high BAC, recidivists (lower BAC) and alcohol dependent persons. The emphasis for mandatory interlock use is more on specific prevention, where the

[4] Remark by the author: In Germany, those organisations have a consulting function and are legally not empowered to impose sanctions on offenders.

recommended target group is mainly recidivists. Answers of two countries (B, CZ) are relatively strict in comparison to the other answers: The Czech Republic requires the lowest BAC limits for suitable target groups. Belgium states, that voluntary interlock use is generally not recommended for any driver group, but mandatory interlocks are recommended for offenders over the legal BAC limit. Finally, interlocks (either voluntary or mandatory) are often recommended for professional drivers.

Table 6.2: *Proposed target groups for voluntary interlock programmes*

Country	None	Novice drivers	First offenders	Recidivist offenders	Professional drivers	Others
A	--	--	--	--	--	**X** (all drivers who want to)
B	**X**	--	--	--	--	--
CZ	--	**X** (offenders, alcohol abusers)	**X** (BAC ≥ 0.3 g/l)	**X** (BAC ≥ 0.1 g/l)	**X**	**X** (parents of young drivers lending their car to them)
D[3]	--	--	--	--	--	**X** (all drivers who want to)
FIN	--	--	**X** (BAC ≥ 0.5 g/l)	**X** (BAC ≥ 0.5 g/l)	**(X)**	--
NL	--	--	--	--	**X**	--
UK	--	--	**X** (BAC < 1.5 g/l)	--	--	--

Table 6.3: *Proposed target groups for mandatory interlock programmes*

Country	None	Novice drivers	First offenders	Recidivist offenders	Professional drivers	Others
B	**--**	--	**X** (BAC ≥ 0.5 g/l)	**X** (BAC ≥ 0.5 g/l)	--	**X** (drivers whose medical condition does not reach minimal standards with a BAC ≥ 0.2 g/l)
CZ	--	**X** (drugs and alcohol abusers)	--	**X** (BAC ≥ 0.3 g/l)	**X** (conveyance of passengers)	--
D[3]	--	--	--	--	--	**X** (after/instead of license withdrawal)
SF	--	--	--	**X** (BAC ≥ 0.5 g/l)	**--**	--
NL	--	--	--	--	**X**	--
UK	--	--	**X** (BAC ≥ 1.5 g/l)	**X** (generally)	**(X)**	--

Financing interlock programmes
For both, voluntary and mandatory interlock programmes, there is agreement that all expenses (interlock device, installation fee, service and maintenance, necessary medical examinations etc.) should be paid by the driver. For professional drivers, the company should finance interlock use. 'Mixed' models of financing were also proposed: For voluntary interlock programmes, the Czech Republic favours public financing of the device and its installation with all other remaining costs paid by the driver; The UK suggests an arrangement with the interlock supplier to reduce some costs for the driver (device, installation, service checks). For mandatory programmes, the UK proposes to split the costs for the device and its installation between the driver and the National Government and to shift the costs for servicing the BAIID to the equipment supplier.

Advantages and disadvantages of interlock programmes
Primarily, interlock programmes are supposed to effectively prevent drinking-and-driving offences and to be a good alternative to license suspension. However, high costs of the programmes were seen as problematic. For voluntary programmes, it is feared that participation rates will be low and only strongly motivated drivers will be reached, i.e. there is no effect on serious offenders with voluntary programmes. The implementation of mandatory programmes, on the other hand, is assumed to be legally more difficult. The following table gives an overview on the supposed advantages and disadvantages of interlock programmes (Table 6.4). The number in brackets is the number of answers in that category.

Table 6.4: *Advantages and disadvantages of interlock programmes*

Advantages	Disadvantages
Voluntary interlock programmes	
• effective prevention of drinking-and-driving (3) • alternative to license suspension (car can be used even after a DUI offence) (2) • juridically more easily feasible than mandatory programmes (1) • costs to be paid by the offender and/or his company (1) • contribution to self-motivation, and (improvement of) self-awareness (1)	• selective group of motivated participants, no effect on serious offenders (3) • high costs (2) • low participation rates (1) • possibly more difficult to impose sanctions (1) • problems of responsibility might occur in case of failure of the BAIID (1)
Mandatory interlock programmes	
• helpful restrictive and educational intervention, especially for recidivists (4) • alternative to license suspension (2) • longer control period of the drinking-and-driving behaviour (1) • may reach more participants than a voluntary programme (1) • offenders and alcoholics stay socially integrated (1) • one can count on the responsibility and consciousness of those offenders preferring a mandatory interlock over other possible sanctions (1) • when implemented for transport companies (conveyance of passengers) it can preventively increase safety (1)	• high costs, problems with financing (3) • legal changes necessary, possibly legal barriers (2) • possibility of manipulating the device (2) • lacking evidence of mandatory programmes being more effective in reducing recidivism than voluntary programmes (1) • dangers possibility emanating from interference of several in-car devices or the operation of the BAIID while driving (1) • probably need to train police staff (1)

Legal aspects affected by the implementation of interlock programmes

There is no clear picture whether, and which, legal aspects are affected by the implementation of interlock programmes. Answers broadly differ with respect to detail, therefore aggregation and interpretation is problematic. Obviously, in Europe, the subject of interlock programmes is still not fully developed and legal issues have not thoroughly been considered yet. However, all statements on legal aspects assumed to be concerned with the implementation of interlock programmes are listed below (Table 6.5), since they might serve as a basis for further investigation and discussion.

For the most part, legal aspects of license suspension and re-instatement (e.g. providing the interlock as alternative to other sanctions) are assumed to be affected by the implementation of interlock programmes. Legal aspects covering technical issues of the BAIID (e.g. type approval, technical regulations, electromagnetic compatibility [EMC]) come second as the aspects mentioned most often.

Table 6.5*: Legal requirements for interlock use on a voluntary basis according to the questionnaire*

Country	Voluntary interlock programmes	Mandatory interlock programmes
A	0[5]	**Traffic law:** (not specified) **Liability law:** (not specified) **Insurance law:** (not specified)
B	**Traffic law:** The BAIID should respect technical regulations in cars	**Traffic law:** Driving license, technical control of vehicles **Criminal law:** Relation with traffic law **Liability law:** Calibration of the device **Insurance law:** Acceptance of the fact that driving with an interlock is a 'good and normal risk'
CZ	**Traffic law:** Law on motor vehicles, Highway Code **Criminal law:** Law on motor vehicles, Highway Code, Penal Code **Liability law:** Law on motor vehicles, Highway Code, Penal Code **Insurance law:** Law on Insurance	**Traffic law:** Law on motor vehicles, Highway Code **Criminal law:** Penal Code **Liability law:** Law on motor vehicles, Highway Code, Penal Code **Insurance law:** Law on Insurance
D[3]	**Other legal aspects:** Vehicle immobilizers have to be EU approved.	'?'
DK	**Traffic law:** (not specified)	**Traffic law:** (not specified)
E	0[5]	0[5]
F	**Traffic law:** Possibility for the prosecutor to propose an interlock as an alternative sanction **Criminal law:** BAIID usage has to be implemented as additional or alternative to the sentence **Insurance law:** (not yet studied)	**Traffic law:** Possibility for the prosecutor to propose an interlock as an alternative sanction **Criminal law:** BAIID usage has to be implemented as additional or alternative to the sentence

[5] „0' indicates that no answer was given to this question.

FIN	**Traffic law:** Requirements of driving license re-instatement; Justification of driving suspension and effects on re-instatement of driving license / driving bans; Medical requirements for re-instatement of driving license (for example regarding dependence on alcohol). **Criminal law:** BAC/BrAC limits: DUI offence and aggravated DUI offence, aspects regarding other drugs than alcohol; Effects on re-instatement of driving license/driving bans; Medical requirements for re-instatement of driving license (for example regarding dependence on alcohol) **Insurance law:** Perhaps some revisions/definitions in the obligatory traffic insurance law **Other legal aspects:** EU council directive (91/439/EEC), directions from the Ministry of the Interior and Ministry of Health of Finland; National and EU legislation of the construction and equipment of the vehicle; Type approval regulation of vehicles in EU; EMC directive; Directive of ergonomics of the vehicle; Competition legislation of EU; National legislation of medical research if rehabilitation is included; Acceptance of privacy commissioner if information of interlock users is compiled from different registers	**Traffic law:** Effects on driving bans/driving license **Criminal law:** A revision according to needs of the interlock programme (not seen as being realistic) **Insurance law:** Perhaps introduction of a new risky drivers group in the obligatory traffic insurance law.
NL	None	None
UK	**Traffic law:** (not specified) **Criminal law:** (not specified) **Liability law:** (not specified) **Insurance law:** (not specified)	**Traffic law:** (not specified) **Criminal law:** (not specified) **Liability law:** (not specified) **Insurance law:** (not specified) **Other legal aspects:** Human Rights Act

Generally, little legal problems were envisaged for the implementation of **voluntary** interlock programmes. Most countries (B, D[3], DK, F, FIN, NL, and UK) assume that voluntary interlock programmes would not require legislative changes. Finland states that a change in legislation would presumably be necessary, while no further effects of the alcohol interlock on legislation concerning the re-instatement of driving license or driving bans are to be expected. If there were a fixed-term law regarding the use of interlocks in Finland (for a field experiment), no legal hindrance would be seen. The Czech Republic foresees a necessity to change laws on motor vehicles, the Highway Code and the Penal Code. Spain, and Austria gave no statement to this question.
For **mandatory** interlock programmes, the situation differs: Only two countries (D[3], NL) do not see a necessity to change current legislation. For France, mandatory interlock use would be possible without legislative changes only within a pilot trial. All other countries suppose that traffic law needs to be changed to empower authorities to impose an interlock, to allow interlock as alternative to driving bans and/or as a condition for license re-instatement. For Belgium and the Czech Republic, changes in all legal aspects mentioned (see Table 4) are supposed to be needed.

[3] For Germany, this statement gives the opinion of the respondent (Dräger) and does not necessarily reflect the official position of the Federal German Ministry of Transport, Building and Housing.

Consequences of interlock programmes for the driver
The idea of incentives for those drivers who voluntarily participate in an interlock programme is generally favoured (exceptions: B, D[3]). Incentives for participants should mainly be a reduction of the sentence, i.e. no or a shorter suspension time for offenders. Monetary incentives could consist of a bonus system of the insurance company or - for professional drivers – the employer. 'Company preventive programmes' (CZ) and 'Preservation of the job' (NL) were also mentioned as an incentive for voluntary interlock use.
Regarding legal consequences for participants who do not comply with programme requirements (e.g. driving an non-interlock vehicle, system manipulation attempts etc.), there is a clear picture that the license of those drivers should be revoked (i.e. suspension period starting again) and a fine should be imposed (or even a prison sentence). This also implies that those drivers should be excluded from further participation in the interlock programme.

Interest in the idea of a European pilot trial
There is a major interest in the subject of interlocks in European countries. Four countries (B, F, NL, and UK) are willing to participate in a European pilot trial on interlocks. Six countries (A, CZ, D[3], DK, E, and FIN) have not yet decided on their participation in a trial, but like to be kept informed of the possibilities. None of the countries was principally not interested in participation.

Additional comments
The questionnaire provided some space for additional comments. Those comments and further remarks not belonging to particular questions, but providing additional information are listed below. Comments are not aggregated, but quoted word for word.
- Austria: "Interlocks should be implemented in accompaniment to existing measures aimed at changing drivers' attitudes."
- Belgium: "One has to consider the fact that an alcohol ignition interlock, as an alternative to standard punishments such as fines and prison sentences, will probably be far more quasi-mandatory than genuinely mandatory. After all, for ethical reasons, offenders are usually given the choice between a standard punishment and an alternative."
- Czech Republic: "We are not familiar enough with technical and functional details of the system of alcohol ignition interlock. Our answers are approximates and estimates."
- Germany (Dräger): "The answers reflect a personal opinion and are not an official statement. It will be difficult to get such an official statement in Germany, because of the federal structure of the Federal Republic of Germany. Some aspects concern federal law, some depend on the individual judges and some on the local driving license authorities."

6.2. Survey in interlock-experienced countries

Seven of the thirteen experts of countries having already implemented interlock programmes answered the questionnaire (Annex 6). One answer came from Australia, three from Canada, two from the USA, and one from Sweden (see Annex 7).

6.2.1. Australia

For drivers under the age of 25, provisionally licensed drivers and professional drivers, the legal BAC limit in Australia is 0.0 g/l. For drivers of 25 years and up with an 'open' license, the legal limit is 0.5 g/l. There is no specific legislation for BrAC limits in Australia. When committing a DUI offence, regularly the licence is suspended and a fine is imposed. The time of suspension and the amount of the fine is determined by the BAC level and the previous

[3] For Germany, this statement gives the opinion of the respondent (Dräger) and does not necessarily reflect the official position of the Federal German Ministry of Transport, Building and Housing.

drink-driving history. The traffic authority re-instates the driving license at the end of the suspension period except in the case of an absolute suspension (2 years). The offender will have to make a formal application to the authority to have the license re-instated.

Regarding interlock programme developments in Australia, there have been several pilot trials. New South Wales started a trial in 2000. As yet no definite decisions have resulted from the trial. South Australia ran a small trial and is currently in the process of sending legislation through parliament. Victoria has been planning for interlocks for some years, but as yet no trial has actually been started. Presently, a pilot is carried out in Queensland, which is described in the following paragraph.

Queensland

In February, 2001, Queensland implemented a pilot interlock programme. In principle the programme is targeted at all DUI offenders, on a voluntary basis. For programme participants, the fine is waived or reduced and the suspension period is shortened. However, there are mandatory minimum periods of suspension which must be served. In the current trial, having an interlock fitted into the vehicle is preceded by attendance of an 11-week drink-driving rehabilitation programme (1½ hours per week). A medical check is not required for programme applicants. Approximately one participant per month joins the programme. The fail level of the BAIID used in the programme is 0 g/l BAC.

To enable the trial to proceed as quickly as possible, a decision was made to implement the programme through the juridical system rather than the administrative system, i.e. offenders are asked to participate in the programme when they appear in court on a drink-driving charge. If they agree, they are assessed by the Community Corrections for their suitability, and are then put on a Probation Order. This is carried out through the Penalties and Sentences Act (criminal law). The Magistrate allows the individual driver to join the programme.

In the Queensland pilot the BAIID supplier and the Centre for Accident Research and Road Safety – Queensland (CARRS-Q) analyse and process the recorded data of the BAIID. This information is then forwarded to Community Corrections. The data is stored and used by the CARRS-Q and the Community Corrections. Compliance with the programme requirements is monitored and enforced by the Community Corrections, whose Officers give recommendations to the Magistrate in case of non-compliance. The Magistrate is responsible for the final decision about the consequences.

In the pilot programme, the BAIID supplier provides the devices free of charge to the offender. All other costs (installation, service and re-calibration of the BAIID, data downloading, technician's call-outs) are paid by the offender.

The implementation and operation of the Queensland pilot did not require any legislative changes. However, the programme has a bearing on traffic law (Transport Operations [Road Use Management and Safety] Act) and criminal law (Penalties and Sentences Act). For insurance law and for elements of the Police Powers Act, it is envisaged that legislation may need to be addressed in future.

Although the pilot is still in its early stages, experience so far indicates that, if a decision is made at the end of the trial to proceed with interlocks as a legislated sanction, then it may be more efficient to follow an administrative model and implement the programme through Queensland Transport. To achieve this, there would have to be very considerable changes made in current legislation.

A positive experience, reported in the Queensland trial, is that it was not hard to find participants for the programme, this in contrast to the international experience of very low participation rates. A main difficulty of the programme is the constant delays regarding critical decisions from public sector agencies (e.g. Transport, Police, Magistrates), and the public sector's implementation of the necessary processes to support the programme.

6.2.2. Canada

The legal BAC limit in Canada is 0.8 g/l under the Criminal Code of Canada. Ten provinces and three territories also have limits ranging from 0.4 to 0.8 g/l. The distinction is that exceeding provincial or territorial limits results in a license suspension, ranging from twelve hours to ninety days, whereas a DUI charge can only be laid if the driver is over the Criminal Code limit. Specific BrAC limits are not applied in Canada.
According to the Criminal Code of Canada, a first offence for driving with a BAC of > 0.8 g/l is a license suspension of one year. However, since July, 1999, the Criminal Code of Canada has allowed provinces in Canada to reduce the mandatory period of suspension for a first DUI offence from one year to three months, if the offender participates in an interlock programme for the remainder of the one-year period (hard suspension of three months plus nine months on interlocks). The mandatory driving prohibition period, imposed under the Criminal Code, effectively prevents participation in an interlock programme at an earlier stage following conviction for DUI.
For license re-instatement, in most Canadian provinces/territories the driver makes an application to driver licensing authorities after expiry of the period of license suspension or revocation, and upon completion of any other conditions that may have been imposed. Most provinces/territories require a DUI offender to take an alcohol educational course or treatment (depending on whether they are a first or repeat offender, and in some cases on the results of an assessment).
In Canada, the traffic laws, which are under the responsibility of each province, determine the conditions surrounding the interlock programme. The programme must follow the rules imposed by the Criminal Code of Canada.
The first interlock programme was a field/pilot trial in 1990 in the Province of Alberta. Currently, interlock programmes run in two of thirteen provinces of Canada (Alberta and Quebec). The Yukon territory was scheduled for a programme in June, 2001, and the province of Saskatchewan in July, 2001. Ontario passed legislation in December, 2000, making interlocks mandatory for all DUI offenders as a condition of license re-instatement following a DUI conviction; however that programme is not expected to commence before 2002.
Regularly, participants are self-selected by volunteering for the programme. The Quebec programme is only voluntary, whereas the Alberta programme allows both, voluntary and mandatory participation. Licensing authorities are responsible for monitoring/enforcing compliance with the programme requirements, as well as the police on the road. The service provider is the primary custodian of the recorded interlock data, and responsible for analysing and processing data to the extent required, to ensure that offenders who do not comply with conditions of participation are reported to administering authorities. Administering authorities have full access to programme data at all times in a format that can be custom tailored to jurisdictional requirements. The data is the property of the jurisdictional administering authority. The licensing authorities, or more generally the jurisdictional administering authority, are responsible for imposing sanctions if a participant does not comply with the programme requirements (e.g. driving an unequipped vehicle).
A general positive experience reported in the Canadian voluntary interlock programmes is a dramatic reduction in repeat DUI offences while on the programme. Negative experiences concern the low participation rate. The great majority of DUI offenders will not volunteer and pay for an interlock programme (and the restriction on freedom that it entails) when the risk of being caught driving without a license is low. A positive experience with the mandatory programme is that it effectively controls drinking-driving behaviour and provides an opportunity to address underlying drinking problems while the device remains in the vehicle. A problem with mandatory programmes is the risk that large numbers will choose not to have their licence re-instated when they become eligible and, instead, will drive outside of the system of legal licensing and control. Specific details of the two Canadian programmes are described below.

Alberta

In Alberta, repeat offenders are required to attend a hearing before an administrative tribunal called the Driver Control Board for license re-instatement. The Driver Control Board has broad discretionary powers to impose conditions and restrictions on the driving licenses of persons who are believed to represent a high level of risk in traffic safety. Such conditions and restrictions may include treatment, participation in Alberta's alcohol interlock programme etc.

Since 1994, interlock programmes have been applied as a regular measure in Alberta. The number of participants has increased gradually to just under 1,000 drivers at present. The interlock fail level is 0.4 g/l BAC (warn at 0.2 g/l). Most participants are self-selected by volunteering for the programme. For first offenders, the programme is voluntary. For repeat offenders, it is voluntary for some and mandatory for others: On an individual basis, the Driver Control Board in Alberta can mandate any suspended repeat DUI offender to participate in an interlock programme as a condition of re-instatement.

All incurring costs of the programme (device, installation, service, and insurance) are paid by the driver. Programme participants must inform their insurance company of the interlock. This also serves as notice that the driver has been convicted of a DUI offence, which leads to insurance premium surcharges, which proved to be the greatest financial disincentive. The legal consequence for a driver who violates the obligation to use an interlock is the return to full suspension. Additionally, there may be charges for driving without a valid license. Other measures to control drinking-driving behaviour would probably be considered (e.g. vehicle seizure, home detention with electronic monitoring, incarceration).

The implementation of the interlock programme required legislative changes. For the voluntary condition, it was necessary to allow a reduction in suspension time. For mandatory interlocks, traffic law was changed to provide for the fact that the use of an interlock can be required as a condition of re-instatement. Aspects within criminal law affected by mandatory interlock programme are unclear at this time.

Quebec

Additional to the legal BAC limit, Quebec provides a 0.0 g/l BAC limit for novice drivers (first three years) as part of a Graduated Licensing System. For novice drivers driving with a BAC of more than 0.8 g/l, there is also an immediate 15-days license suspension. For license re-instatement, first offenders must also follow a 3-hour awareness session. Second offenders must provide a satisfactory evaluation by a recognised centre in the treatment of alcoholics.

In Quebec, interlock programmes have been implemented as a regular measure since December, 1997, with no preceding pilot or field trial in this province. The programme is currently only voluntary, although legislation is expected to be introduced in the near future which will make it mandatory for repeat and high BAC offenders. The fail level of the BAIID is 0.2 g/l BAC in order to allow some margin for food containing alcohol. However, the participants in the programme are told that there is a zero BAC policy. Annual participant rates vary between 2200 and 4000 (average 3000).

Target groups for the Quebec interlock programme are first offenders of a BAC above 0.8 g/l, and alcoholics. For first offenders, participation in the interlock programme can be used to reduce time of hard suspension (from one year to three months). In the case of alcoholics, the SAAQ (government agency which delivers drivers licences) can put a restriction on their license. Those drivers will be allowed to drive only a vehicle equipped with an interlock, as long as they have an alcohol problem (not provided a satisfactory evaluation). The SAAQ is also the responsible authority for all other tasks within the interlock programme (monitoring/enforcing compliance, data processing, storage and usage, and ordering sanctions for non-compliance).

The Quebec programme, is a user-pay programme, i.e. all expenses are paid by the convicted driver. The programme works on a rental scheme: the participant has to pay CAN $ 125 for installation plus CAN $ 87.50 per month.

The implementation of the programme in Quebec required some legislative changes. For example, it was to specify which drivers are eligible for the programme and after which

period. Additionally, a restricted license had to be created (specification 'must drive with an interlock'). The possibility of earlier re-instatement of driving privileges when participating in the programme had to be determined under traffic law.

6.2.3. Sweden

In Sweden, the legal BAC limit is 0.2 g/l (BrAC limit: 0.1 mg/l) (Annex 2). When committing a drinking-and-driving offence with a BAC of 1.0 g/l or more, the license is revoked for a period of one to three years. Below that level (i.e. 0.2-0.99 g/l BAC), the revocation period is between one month and three years. For license re-instatement, application for a new license at the county administration is required. A medical certificate that proofs a sober way of living is mandatory for those with a BAC of 1.0 g/l or more. After an unconditional revocation for more than one year, new theoretical and practical tests are mandatory.
Since February,1999, pilot interlock programmes have run in three of the 21 counties of Sweden. Participation is voluntary and replaces an unconditional license revocation, i.e. the participant can drive a car during the revocation period and is to regain the same privileges as s/he had prior to the conditional driving license revocation, without having to complete new driving tests. Target group of the programme are drunk drivers with no other traffic offences. The interlock device is calibrated at the legal limit (0.2 g/l). The county authority is responsible for the interlock programme: it selects eligible participants (after their application), analyses, stores and uses the BAIID data, and imposes sanctions for non-compliance with the programme requirements. All expenses of the programme are paid by the participant.
When notifying a person that his or her driving license has been revoked, the county administrative board also includes information about the conditional driving license revocation and the trial. Subsequently, the following steps apply:

1. contract with the interlock supplier (valid only if the county administrative board grants permission to participate in the trial)
2. medical examination
3. signing of the declaration of intent
4. application sent in to the county administrative board.
5. after approval by the county administrative board, installation of the alcohol ignition interlock and inspection.
6. the Swedish National Road Administration issues a conditional driving license
7. a complete medical examination after approximately three weeks
8. appearance at the Swedish Motor Vehicle Inspection Co. every other month to check and calibrate the interlock.
9. medical check-up every third month after the initial complete medical examination.
10. new driving license issued after completion of the two year trial/ conditional period. The new driving license entitles the holder to the same privileges as he or she had prior to the conditional driving license revocation.

If a driver wants to participate in the programme, s/he has to:

- accept the terms and conditions by signing a declaration of intent,
- contact the interlock supplier and sign a contract with him/her,
- drive only the car specifically equipped with an alcohol ignition interlock during a conditional period of two years,
- drive the vehicle in Sweden only,
- undergo regular medical check-ups and follow the demands stated.
- ensure that the car is inspected at the Swedish Motor Vehicle Inspection Co. every eighth weeks, and
- personally accept responsibility for all the costs directly related to participation.

Legal provisions for the interlock programme in Sweden are:

- Traffic law: Conditional revocation during two years, and a new driving license without conditions and driving tests. The new driving license entitles the holder to the same privileges as he or she had prior to the conditional driving license revocation.
- Criminal law: Revoking a driving license is strictly an administrative road safety measure and not a penalty. Any fine or imprisonment penalty is imposed regardless of whether or not the offender is taking part in the trial; i.e. participation does not affect the type of legal penalty imposed.

The implementation of the Swedish interlock field trial required the establishment of a new legislation (law of conditional license revocation) by parliament.
As a positive effect of the programme, the number of crashes (reported to the police) has been reduced drastically among participants in the interlock programme, compared with the number of crashes recorded in the same group prior to participation in the programme. A negative experience with the programme is that those offenders who have not fulfilled the strict medical regulations in the programme have been excluded instead of letting them participate for a prolonged period.

6.2.4. USA

The legal BAC limit in the USA varies by state. Generally it is between 0.8 and 1.0 g/l. A couple of states, e.g. Maine and Utah, may have a lower limit such as 0.4 – 0.5 g/l for repeat offenders. Breath testing with certified evidentiary equipment is permitted, to establish a BAC estimate. Sanctions for drinking-and-driving offences as well as legal procedures for license re-instatement also vary by state.
The first formal interlock laws were passed in California, Oregon, and Washington State in the mid-1980s. Currently, 42 US states have legislation that allows the installation of BAIIDs in the vehicles of DUI offenders. Texas has the largest interlock programme in the US with about 7,000 – 9,000 participants per year. All together across US states, about 35,000 interlocks are used and it is expected that there will soon be many more, due to new national legislation: Interlock implementation is sometimes just based on the local courts decision and not due to central government policy, but with the TEA-21 national legislation requiring an interlock or impoundment for all repeat offenders, it is expected that the number of users will increase soon.
The courts in the US have very wide discretion: There are individual courts that are using the interlock in the absence of supporting legislation. In some cases the legislation removes the need for judicial discretion, by requiring the interlock with certain offenders (such as multiple offenders). This legislation can be state or national laws.
In the US, the use of BAIID usually reduces the time of hard suspension. As an accompanying measure, it often follows after a brief education programme, a weekend intervention programme or treatment services. Interlock programmes are regularly offered for multiple offenders, but increasingly it is an option for first offenders who want more rapid license re-instatement. Expenses for the programme (device, installation, service etc.) are paid by the offender.
The calibration levels of the BAIID used in the interlock programmes differ by state, but is in all cases lower than the legal limit in the US It was remarked that a zero BAC will create too many false positives and errors due to small amounts of alcohol in foods and endogenous production of alcohol.
The selection of drivers to interlock programmes also varies by state. Sometimes participation is voluntary (to reduce suspension time), sometimes it is required as a condition of license re-instatement, and in one rare case it was required as an alternative to a prison sentence. According to these conditions, there are different motivation conditions for the offenders. The courts can order a BAIID as a condition of probation or re-instatement; the motor vehicle authority can order it as a condition for re-instatement. Monitoring/enforcing compliance with the interlock requirements is usually done by the courts. Analysis and processing of the recorded BAIID data is regularly carried out by the interlock service

provider as a service to the courts or motor vehicle authority. The responsibility for ordering sanctions for non-compliance with the programme requirements depends on who ordered the interlock to be installed. Sanctions vary from simply taking the interlock 'privilege' away to extending suspension or ordering a prison sentence. The following paragraph describes Oregon's interlock programme as an example.

Example: Oregon

Oregon, provides a BAC limit of 0.8 g/l with additional BAC limits for commercial drivers (0.4 g/l) and for drivers under the age of 21 (0 g/l). For a drinking-and-driving offence, there is an administrative license suspension (ALS) that takes effect within thirty days of the arrest, independent of conviction. The length of the ALS varies from ninety days for first offenders failing a breath test, to three years for repeat offenders who refuse the test. There is also a mandatory license suspension upon conviction of one year for a first offence, and three years for a repeat offence.

For license re-instatement, there is a checklist of requirements varying from case to case. To be re-instated at the end of a suspension period usually the offender must show proof of completion of any required or court-ordered alcohol rehabilitation programme, proof of auto liability insurance, and pay a fee. Oregon law also provides for hardship permits, i.e. exceptional permissions that allow restricted driving during suspension, usually to and from work, or to and from alcohol rehabilitation. However, these hardship permits are relatively rare.

The Oregon interlock programme was carried out in 1988 as a pilot trial, and was established as a regular measure in 1993. The programme is implemented in all (36) counties in Oregon with 1200 – 1500 drivers participating annually. Participation is only voluntary, i.e. participants are not required to obtain and use a BAIID, but serve an additional one year license suspension period if they choose not to install a BAIID.

The BAIID is calibrated at a fail level of 0 g/l BAC. Participation in the programme substitutes twelve months license suspension time. Interlocks can be used in combination with other sanctions, but it is not mandated or specifically intended to be used in combination with any particular additional measure.

For programme participation, there are various eligibility requirements to be fulfilled, e.g. completion of an initial license suspension period, not having committed a new alcohol offence, etc. Eligibility is determined by Driver and Motor Vehicle Services Division (DMV) of the state licensing agency. The DMV is also responsible for monitoring/enforcing compliance with the requirement to use an interlock (primarily through the equipment and service provider, Guardian Interlock). Analysis, processing, storage and use of the recorded interlock data are done by the service provider, although use of data for evidence purposes is rare.

The DMV is the responsible actor for ordering sanctions if a programme participant does not comply with programme requirements (e.g. driving an unequipped vehicle, manipulation of the device) for which they rely on a variety of sources, including service provider's reports, police reports or new charges being brought.

The target group for the Oregon interlock programme are drivers just completing a license suspension for conviction of DUI. All incurring expenses are paid by the offender (BAIID, installation in the car, and service). There also exists an indigent driver fund, which will pay the interlock expenses of persons who meet eligibility requirements for assistance. However, this is rarely used.

For the implementation of the interlock programme, Oregon's legislation was changed as a bill was passed that instituted a 12 month supplemental license suspension and provided for participation in a BAIID programme as an alternative to the supplemental suspension. Also new offences were created for driving without a BAIID, and for tampering with a BAIID. As an incentive for participation, supplemental license suspension is remitted.

As a consequence of the Oregon programme, there appears to be a positive effect on re-offence while the device is installed, but no evidence of continuing effectiveness once the device is removed. Circumvention by driving a different car was reported to be easy and appears to be quite prevalent as most households in Oregon have two or more motor

vehicles. However, the drop in recidivism appears to persist despite a believed fairly widespread circumvention. The very small size of the programme is seen as the probably biggest disappointment.

6.3. Conclusions and recommendations

A survey on legal provisions for interlock programmes was conducted in eleven European countries. Ten countries returned the completed questionnaire. Generally, the results indicate high interest in interlock programmes. Four countries are currently preparing a national field trial on interlocks. However, the proposed frame conditions and legal requirements for the implementation of interlock programmes in Europe vary widely. Especially legal aspects do not yet seem to be thoroughly investigated in Europe. Bearing this in mind, interpretation of the answers and recommendations must be tentative. Still the results may provide first ideas on conditions for an introduction of interlock programmes in Europe.

Additionally, an examination of (legal) frame conditions was made of countries already having implemented interlock programmes. Results include information on programmes in Australia, Canada, Sweden, and the USA. While in Queensland, Australia and in Sweden interlock programmes are still in a pilot phase, Canada and the US provide interlock programmes as a regular measure for DUI offenders. Two Canadian provinces have interlock programmes: the Alberta programme provides mandatory and voluntary participation, whereas the Quebec programme is only voluntary. In the US, legislation of 42 states allows interlocks (21 of them provide mandatory interlock programmes).

Conclusively, the following essentials can be derived from the European survey and the descriptions of running interlock programmes of ‘experienced countries’:

- According to the results of the European survey it is conceivable that interlock programmes can be integrated in existing systems of sanctions for DUI offences. For example, they could substitute license withdrawal/unconditional driving bans, respectively shorten the suspension period. Furthermore, they could be implemented in addition to other rehabilitation and/or punitive measures (driver improvement, fines etc.). These ideas exactly mirror the practice of operational interlock programmes: regularly, programme participation substitutes/replaces a certain time period of hard suspension, i.e. the participant has the possibility of earlier re-instatement of driving privileges.

- Regarding appropriate target groups of interlock programmes, two general approaches resulted from the European survey: interlocks can be introduced as a) a general preventive measure (e.g. for all drivers volunteering, for professional drivers) or as b) a specific preventive measure for DUI offenders. Voluntary participation is predominantly recommended for first offenders with a high BAC, mandatory interlocks should specifically target recidivists. Interlock programmes currently operational are especially preventive. They are mostly applied for DUI offenders, either first offenders (mostly voluntary) or recidivists. Mandatory programmes are predominantly applied for recidivist offenders.

- As an outcome of the European survey, interlock programmes should be financed by the participant or – for professional drivers – by the driver’s company. Models of ‘mixed’ financing (public and private) are also conceivable. These suggestions are concordant with currently running interlock programmes: Regularly they are user-paid, i.e. the driver finances all incurring costs. In some cases, public funds are available on an individual

basis for participants who need financial aid. In the Queensland pilot, the BAIID is provided by the interlock supplier free of charge to the participant.

- In Europe, administration of interlock programmes is predominantly seen as the responsibility of executive authorities of traffic safety (e.g. licensing authorities, courts, rehabilitation organisers) as is the case for currently operational interlock programmes. It is suggested that some tasks, especially data analysis, be carried out by traffic research or road safety institutes – as actually done in the Queensland pilot for instance. In other countries running interlock programmes, data handling tasks are either executed by the programme administering authorities themselves or by the interlock service provider, as a service for the administering authorities.

- Along with the European survey, the legal BAC limit is considered as the highest acceptable fail level for the BAIID, which is 0.5 g/l BAC for most of the countries. The major part of countries with interlock programmes provide a fail level below the legal limit, except for Sweden (fail level = legal BAC limit of 0.2 g/l). It is notable, that the US and Canada provide a higher legal BAC limit than most of the European countries. A zero fail level was also suggested in the European survey. Indeed, some interlock programmes apply a zero BAIID fail level (e.g. Oregon/USA, Queensland/Australia). However, mostly a higher fail level of 0.2 – 0.4 g/l BAC is used to allow some measurement tolerance.

- From a legislative point of view, voluntary interlock programmes are supposed to be easy to implement, while mandatory programmes are assumed to require changes in legislation (especially in traffic law). Legal aspects concerned with interlock programmes are mostly seen in issues of license suspension and re-instatement and in technical requirements of the BAIID. Reviewing the examples of currently operational interlock programmes, both voluntary and mandatory programmes required changes in legislation. Predominantly it had to be established that participation in the programme could supplement license suspension. However, in Europe legal requirements for interlock programmes do not seem to have been thoroughly investigated yet, as the survey results indicate.

- About advantages and disadvantages of interlock programmes, the predominant opinion in Europe is that the interlock programme is an effective tool to prevent drinking-and-driving offences and a good alternative to license suspension. High costs are supposed to be the biggest disadvantage of interlock programmes. From currently running interlock programmes in Canada and the US indeed positive effects on traffic safety are reported, i.e. a reduction of DUI offences, re-offences (at least as long as the BAIID is in use) and accidents. Costs do not seem to be a major problem (for these programmes are user-paid). However, a main difficulty with interlock programmes is low participation rates. Furthermore, public sector delays in decision making and implementation of necessary processes were reported.

Conclusively, the following recommendations can be derived from the survey, regarding frame conditions and legal requirements for an interlock programme field trial in Europe:

- Interlock programme trials should be carried out in accordance with and accompanying the existing systems of sanctions for DUI offences. DUI offenders who participate in the programme should be offered incentives to motivate participation (e.g. reduced time of hard suspension, earlier re-instatement of driving privileges).

- Interlock programme trials should predominantly be a measure of specific prevention, i.e. the target group should be DUI offenders. The decision whether first offenders and/or

recidivist offenders should be included, is expected to depend on the nationally established treatments for the different groups of DUI offenders.

- Interlock programme trials for DUI offenders should be user-paid, meaning that the participant pays the device (possibly in the form of a rental scheme), its installation and service, medical checks etc. as those costs can be justified if the driver benefits from participation (see above). However, alternative models of financing should be discussed, e.g. public grants for needy participants, cost splitting between participant and public sources/supplier.

- Administration of interlock programmes should be done by executive authorities in charge of traffic safety issues. As the responsibility for such tasks depends on the individual national system of legislation, questions regarding the administration of interlock programmes will have to be regulated individually within the participating countries.

- Assuming that interlock programmes are primarily used as a tool for learning to drive soberly, or to separate drinking and driving (i.e. specific prevention), a BAIID fail level of 0 g/l BAC would be the best alternative. However, to allow some measurement tolerance (e.g. for food containing alcohol) and thus to reduce false alarms a BAIID fail level of 0.2 g/l is recommended for the European interlock field trials.

- Further investigations on particular legal requirements of interlock programmes and possibilities of their establishment are necessary. Some legal aspects may be centrally regulated as they fall under EU legislation (e.g. type approval), others will have to be individually solved for each country (e.g. license revocation and re-instatement). These investigations should be part of the concrete conception and implementation of field trials in the participating countries.

7. DESIGN OF A BAIID FIELD TRIAL

René Mathijssen (SWOV)

When designing a BAIID field trial, two types of BAIID use have to be distinguished: commercial use, mainly by professional drivers, and use by convicted DUI offenders.
In the case of commercial BAIID programmes, BAIIDs are not installed in vehicles as a result of a DUI conviction, but as a merely preventive measure, taken by private companies. BAIID use in commercial programmes is not enforced by the police, by probation officers or licensing authorities, but by the private companies themselves.
BAIID use by convicted DUI offenders is mandatory, if ordered by the court (under criminal law) or the licensing authority (under administrative law). If a DUI convict is given the choice between participating in a BAIID programme or an other sanction, for instance a period of hard license suspension, the BAIID use is voluntary. Enforcement of BAIID use by DUI offenders will be mainly a task of probation officers or the licensing authority.
Evaluations of the effects of each type of BAIID use require specific experimental designs.

7.1. Target groups for commercial BAIID use

Possible target groups for commercial BAIID programmes are tour operators, (local) bus companies, dangerous goods or heavy freight transport companies, taxi companies, or driving schools. The actual use of BAIIDs by the drivers involved should of couse be compulsory.
The greater the drink-driving problems of the target group are, the greater the beneficial effects of a commercial BAIID programme on road safety will be. A suitable target group might consist of touring car drivers of long-distance shuttle lines, for instance from Northwest-Europe to the Spanish Costas, and vice versa. According to the Dutch newspaper 'De Telegraaf', in 2000 an occasional alcohol control was held by the Spanish police, aimed at bus drivers who were shuttling between the Netherlands and the Spanish Costa Brava on behalf of a Dutch tour operator. Out of the twenty drivers tested, four proved to be under the influence of alcohol. The alcohol control was, in fact, instigated by the tour operator in question, after rumours and complaints by travellers about drinking bus drivers. In other countries, other target groups might be more suitable.

7.2. Target groups for BAIID use by DUI offenders

Due to the great variety in sanctions for driving under the influence of alcohol in the various EU-countries (cf. Chapter 6), it is not recommended to define one or more target groups in terms of offender types, like first- or second-time offenders, etc., but in terms of the sanctions imposed. In that case, the definition of target groups could be related to the sanctions of license suspension (imposed by the court) and/or mandatory rehabilitation/driver improvement courses (imposed by the licensing authority).

Criminal law

Under criminal law, the following DUI convicts might be a target group for BAIID use:
- DUI convicts that, if the sanction of mandatory BAIID programme participation would not exist, would have had only a period of probationary license suspension imposed by the court. For these convicts the mandatory BAIID use would mean an aggravation

of the sanction, which in most EU-countries would probably require an amendment of the law.

- DUI convicts that, if the sanction of mandatory BAIID programme participation would not exist, would have had a period of hard license suspension imposed by the court. For these convicts the mandatory BAIID use would mean an alternative sanction: (part of) the hard license suspension period is replaced by a probationary license suspension period, combined with mandatory BAIID use. If the court leaves the choice between hard suspension or participation in a BAIID programme to the discretion of the convicts, the programme is quasi-voluntary. Participation rates will then probably be (much) lower than in the case of fully mandatory participation. At least in some EU-countries, participation in a BAIID programme can be imposed without an amendment of the law.

Administrative law

Under administrative law, mandatory BAIID use might be imposed on all drivers who have to follow a rehabilitation course in order to keep their driver's license. For these drivers, too, the mandatory BAIID use would mean an aggravation of the sanction. In which countries this would require an amendment of the law, has not become very clear from the inventory of legal requirements and possibilities (cf. Chapter 6), probably reflecting the fact that these have not yet been considered in detail.

Most desirable versus most realistic target group

The most desirable target group is probably the group of drivers who have to follow a rehabilitation course, since BAIID use may be more effective, if it is combined with rehabilitation (Marques et al., 1999). The effectiveness of rehabilitation courses will probably increase, in their turn, by combining them with a BAIID programme. There seem to be some major practical problems, though. Some of the drivers who have to follow a rehabilitation course, may have had a period of hard suspension and/or a period of mandatory BAIID use imposed by the court, which might interfere with BAIID use as part of a rehabilitation course. The most realistic target group for an EU BAIID experiment is probably that of DUI offenders who have had a period of mandatory BAIID use imposed by the courts, as an alternative for a period of hard license suspension. If these drivers also have to follow a rehabilitation course (and in some EU-countries this will be the case for nearly the entire group), it is recommended to find ways of combining the two.

In order to stimulate BAIID programme participation by DUI convicts, it seems to be advisable to avoid a preceding standard hard suspension period. On the one hand, a convict's financial position might deteriorate dramatically as a result of hard suspension, since for commercial drivers it could be grounds for dismissal. And, on the other hand, although suspended, a DUI convict might still drive a car and perceive a very low risk of apprehension. In both instances, the cost of BAIID use might exceed the convict's perceived benefit of it. This might especially be important, if a DUI convict was given the choice between a period of hard suspension or entering a BAIID programme. Therefore, preceding hard suspension periods should preferably be restricted to very serious DUI cases.

7.3. Duration of an experimental BAIID programme

BAIID installation in commercial vehicles, like buses, taxis or heavy freight vehicles, should cover the whole experimental period, since it is intended to be a permanent measure.

The period of BAIID use imposed by the courts, might be linked to the period of probationary license suspension that it is combined with; for instance:

- As an alternative for 3 months of hard suspension: 6 months of probationary suspension in combination with 18 months of BAIID use.
- As an alternative for 6 months of hard suspension: 9 months of probationary suspension in combination with 21 months of BAIID use.
- As an alternative for 9 months of hard suspension: 12 months of probationary suspension in combination with 24 months of BAIID use.
- As an alternative for 12 months of hard suspension: 3 months of hard suspension and 12 months of probationary suspension in combination with 24 months of BAIID use.

The prolonged periods of probationary license suspension might give rise to objections from the United Kingdom, Austria, and the Czech Republic against BAIID programmes replacing or mitigating existing sanctions (cf. Chapter 6).

If BAIID programmes become an integrated part of rehabilitation courses under administrative law, those programmes could probably be better tailored 'to match the characteristics of the participant'. In that case, pre-conviction programme participation would also be possible (Beirness, 2001a). A practical problem, however, would occur if, in a later stage, the court would impose a period of hard suspension.

7.4. Some characteristics of an experimental BAIID programme

BrAC threshold

The main goal of a BAIID programme for DUI offenders should be that participants learn to separate drinking from driving by tackling their drinking problem. For that reason, a Breath Alcohol Concentration (BrAC)-threshold of 0 mg/l would be preferable. On the other hand, the breath testing device may produce small positive test results, even if a person had not drunk alcoholic beverages. This may, for instance, be the case when a person has been eating bread shortly before the test. During SWOV roadside surveys, several drivers who had been eating bread, produced positive BrAC readings on a Dräger Alcotest 7410 Plus screening device. Initial test results varied from 0.02 to 0.07 mg/l; a re-test five minutes later always showed a negative test result. Slight positive test results also occurred if a driver had some mouth alcohol due to having used a 'fresh-breath' spray or having eaten a bon-bon containing a very small amount of alcohol. And, finally, slight positive readings also occurred without a clear cause. These results from SWOV roadside surveys have not been pub/lished. So, for practical reasons and for the sake of legal security, a BrAC threshold of 0.10 mg/l is recommended. Depending on national legislation, this threshold equals a BAC varying from 0.21 to 0.23 g/l.
For countries with a statutory zero BAC limit, like the Czech Republic, it may be necessary to accept a lower BrAC threshold; for instance, one that is comparable to the threshold of the screening devices used by the police.

For commercial BAIID programmes the same BrAC threshold is advisable as for programmes imposed by the courts, since the BAIID should prevent the driver from having an even slightly enhanced accident risk due to drinking alcohol. This is because accidents these drivers get involved in, often have a very serious outcome, not only for the drivers themselves but especially for their passengers, collision partners and/or the environment (in the case of dangerous goods transport).

Installation of an emergency by-pass switch

Whether a BAIID should be provided with an emergency by-pass switch, depends on the risk of false positive readings and other kinds of malfunction of the device. In the literature on BAIIDs, nothing was found on this subject. During preliminary SWOV-testing, the connector of the detachable sample head broke down, necessitating the use of the by-pass switch to get the car started.
If such a by-pass switch is provided, making use of it should be considered to be a programme violation, except when the driver can prove force majeure. The by-pass switch should allow for single-use, resulting in a compulsory visit to the service provider within a few days. Otherwise, the car should be immobilized.
It seems advisable to install an emergency by-pass switch in the vehicles involved in an EU field trial, and to evaluate legitimate and illegitimate use.

Technical requirements

Ideally, the technical requirements of BAIIDs should be uniform for all EU-countries. Furthermore, they should ideally meet the highest possible technical standards, these for the moment being the Alberta standards. But, on the other hand, lack of competition between manufacturers may increase the cost of the devices. This may strongly influence a DUI offender's willingness to participate in a BAIID programme, and thus the (cost-) effectiveness of such programmes. So, in order to stimulate competition, it might be sensible to allow some variation of the technical requirements of BAIIDs between EU-countries, depending on their geographical and climatic conditions. It does not seem necessary for all EU-countries that the devices function accurately up to a height of 3,500 metres or within a temperature range of -45 to +85° C.

7.5. Experimental designs to evaluate the effects of BAIID programmes

Evaluation of commercial BAIID programmes

The design of a commercial BAIID experiment should be aimed at evaluating the effect of BAIID use on the BrAC distribution of the drivers involved. The design can be relatively simple: a pre-test and post-test (= during BAIID use) with control group. The experimental group should contain at least 100 vehicles, and a substantial part of these should be easily retrievable for breath-testing of the drivers.
Before and during BAIID installation, (repeated) random samples of drivers from the experimental and control group should be breath-tested for alcohol. The required sample size of both groups will depend on the BrAC distributions which are found during the first phase of the pre-test. These BrAC distributions will give an indication of the sample size that is needed in order to get significant effects (at a 95% probability level).
If BAIIDs are installed in long-distance shuttle buses, a practical problem might be that random roadside breath-testing at both ends of the trip is required, in close co-operation with national police forces in order to avoid non-response. Roadside testing should be performed with reliable breath-test devices which present an accurate BrAC result (as opposed to a wide BrAC class, as is often the case with police screeners).
If BAIIDs are installed in local buses, taxis or heavy freight vehicles, the data collection will be easier, because it can be restricted to one country. On the other hand, the assessment of effects on BrAC distributions may be more difficult, if drinking by the drivers involved is very rare (as seems to be the case in the Netherlands, but might be different in other EU-countries).
An EU field trial of commercial BAIID use would have to last at least two years:

- (preparation of) BAIID installation: three months;
- pre-test data collection: nine months;
- post-test data collection: nine months;
- analysis and reporting: nine months.

Evaluation of BAIID programmes for DUI offenders

The design of a BAIID experiment with DUI offenders should be aimed at evaluating the effect of BAIID programmes on recidivism and, if possible, accident rates. Based on the results of the latter evaluation, a cost-effectiveness analysis could be made, for instance by using the 'One Million Euro Test', that is supported by the European Commission: a road safety measure is considered to be cost-effective, if the cost per saved life does not exceed the amount of €1 million (Commission of the European Communities, 2000).

The experimental group might consist of DUI convicts who have had a BAIID programme imposed or offered by the courts, as an alternative for hard license suspension. An important advantage of taking this whole group instead of the subgroup that is actually participating in a BAIID programme, is that the problem of self-selection can be avoided.
The control group should then consist of DUI convicts who have had a hard suspension period imposed in an area where the alternative of a mandatory BAIID programme was not available. In this design, it is important that the control group comes from the same (national) jurisdiction as the experimental group. If that is not the case, it is very well possible that both groups are not comparable with respect to the severity of their drink-driving offences and their risk of repeat drink-driving. Furthermore, the risk of apprehension for DUI should be more or less the same for both groups. This so-called post-test-only design with equivalent groups is probably feasible, although not ideal. In an ideal design, DUI convicts would be assigned at random to the experimental and control condition. But such a design is probably not realistic, since it would create a high degree of legal inequality between equal DUI offenders. (The inequality between DUI offenders in the experimental and control area is not of a legal but of a physical nature, since it depends on the availability of a BAIID programme). Furthermore, the evaluation design would be strengthened by including a pre-test period. This is possible by collecting data on DUI-offences and accident involvement over a certain period preceding alcohol interlock programme participation of license suspension. On the other hand, this would raise the cost of the evaluation study considerably.

In order to get convincing results for policy makers and the general public, the experimental group should contain at least 500 actual BAIID programme participants; the control group might contain approximately 1000 DUI offenders who have had a period of hard license suspension imposed. From a statistical viewpoint, this sample size allows a recidivism reduction of approximately 30% in the experimental group, when compared to the control group, to be significant at a 95% probability level.

Recidivism rates should be compared both during and after treatment in order to assess the long-term effects, preferably by means of survival analysis. This kind of analysis makes it possible to account for competing hazards, like hospitalisation, death, or imprisonment of the drivers involved.

If the experimental group would consist of DUI convicts who are following a mandatory rehabilitation course with integrated BAIID programme, the control group would consist of DUI convicts who are only following a mandatory rehabilitation course. With this design the same conditions with respect to comparability of the two groups are applicable as in the design for DUI convicts who have had a BAIID imposed or offered by the courts.

The duration of an EU field trial of BAIID use by DUI offenders would be approximately 4½ years:

- inclusion period: six months;
- experimental period: two years;
- post-experimental period: one year;
- data collection, analysis and reporting: one year.

If a rehabilitation course is integrated in the BAIID programme, extension of the post-experimental period with one year may be interesting. That is, if the reduction of recidivism during programme participation was significant. In that case, reporting might be split into two parts: after 3½ years on the effect during programme participation, and after 5½ years on the effect after programme participation and BAIID removal from the vehicle.

8. CONCLUSIONS AND CONTINUATION OF THE PROJECT

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This project investigated whether a large-scale field trial on the effects of alcohol ignition interlocks is possible in the member states of the European Union. The feasibility study examined whether a field trial is technically, legally, and socially feasible in EU countries. The limitations of an alcohol interlock are also mentioned. Finally it is described which type of application and use can be expected to be most successful in an EU context..

A number of research strategies have been used. Existing literature has been studied, experts such as researchers in interlock-experienced countries and manufacturers have been talked to, and a questionnaire has been filled in by representatives of both experienced and not-experienced countries. Finally, a workshop has been organised (see Annex 9).

The following issues were looked at in detail:
- which are the technical requirements for the equipment including reliability and proof against fraud and tampering, and do current alcohol ignition interlocks meet the requirements?
- On the basis of a literature review, it has been investigated for which target groups an alcohol interlock would be most appropriate/effective and how it could best be applied.
- In a survey, it has been investigated which the legal requirements and limitations for application of alcohol interlocks are and to what extent alcohol interlocks are legally feasible in EU countries.

Finally, the approach and the conditions of an EU field trial with alcohol ignition interlocks and its evaluation have been set up, specifying:
- which groups of drivers/offenders and which application strategies are most promising to include in a field trial and how should the field trial be set up in order to get a scientifically valid indication of the effectiveness?
- which EU member states would be willing to participate in what type of field trial?

The conclusions of this project will be discussed in the following paragraphs.

8.1. Technological requirements

The factors that determine the type of BAIID to be selected for use in a particular interlock programme, are cost, stability and specificity to alcohol (Beirness, 2001a). Accordingly, it is recommended that only the fourth-generation BAIIDs based on electrochemical sensing technology (fuel cell) be used in prospective EU field trials of interlocks, because the fuel cell devices are alcohol-specific. In addition, it is recommended that the BAC accuracy requirements over an extended temperature range (-45 to +85 °C), mentioned in the Alberta interlock standards, are met to enable the participation of Northern European countries in the trial.
A data recorder in the interlock is a necessary element to recognise and inform the programme monitors on tampering, bypass, and circumvention attempts. Present BAIIDs are fairly effective against cheating, provided that they are properly mounted with sealed wiring. By using anti-circumvention features, BAIIDs recognise artificial breath techniques and filtered air. False positive results caused by other substances than alcohol may occur if a

semi-conductor interlock is used. A non-zero BAC set point is also recommended to avoid false positives and lockouts.

The biggest problem with BAIID use, which is technically impossible to solve, is the fact that a BAIID user may drive a vehicle that is not equipped with a BAIID, even though it is prohibited and may lead to sanctions (Voas & Marques, 1992b).
The assistance of a sober person in driving a BAIID vehicle while the BAC is over the interlock set point is virtually eliminated by anti-circumvention features like hum-tone recognition, blow abort, suck-blow, and random rolling re-test requirements. To conclude, anti-circumvention features are necessary elements of BAIID and some possible negative safety effects of random rolling re-tests can probably be eliminated by proper instruction and training.
BAIID users should be properly instructed in the correct blowing technique before starting to use the interlock. The results from the usability test performed at SWOV and VTT suggest that hum-tone or suck-blow techniques should be trained sufficiently, while driving in real traffic or in a simulator. The SWOV tests also indicate that the use of a by-pass element should be restricted to a very limited number of emergencies, like technical failures of the BAIIDs. Provided that fuel cell interlocks are used, the by-pass element is seldom needed.
The sample head of the BAIID should be installed in the vehicle in a way that it is easy to handle, and the display of the control module of the BAIID should not be susceptible to glare, but be easily visible to the driver. A random rolling re-test requirement may cause stress to some drivers, if not passed at the first attempt and accordingly slightly increase accident risk. However, according to preliminary testing of BAIIDs, there do not seem to be many negative effects on visual performance of driving because of the random rolling re-test requirement .
Both internal visual and audible signals of the demands the BAIID makes, are necessary, especially the audible signal which enables the driver to keep his eyes on the road. However, further testing of the safety aspects of the use of BAIID is necessary.

8.2. Target groups

According to the literature review, prospective target groups of an EU alcohol ignition interlock field trial would be:

1. *DUI recidivists*: Most appropriate group for using the interlocks. Especially drivers who commit another DUI offence, before completing the minimum period of hard suspension, should be required to have an interlock installed in their vehicles, even if they are not legally allowed to drive it for a period of time. It is probable that this group continues drink-driving, even when their licence is suspended. Effectiveness: BAIID use has reduced the number of repeat DUI offences, while installed, by 28-65% (Voas et al. 1999). After removal, re-offence rates tend to return to pre-interlock levels.
2. *First-time high BAC offenders (Aggravated DUI offenders)*: An appropriate group for interlock use. Effectiveness: the interlock, while installed, has reduced repeat DUI offences of this group even more than repeat DUI offences of DUI recidivists. Provided that interlocks can be installed in large numbers, the interlock can be aimed at relatively low risk first-time DUI offenders also as a preventative measure.
3. A group whose dependence on alcohol is estimated medically (no DUI offences, problems with alcohol, willing to drive). These people may have difficulties showing that they are not dependent on alcohol. Their participation must not violate the EC council directive (91/439/EEC).
4. *Professional drivers*: The interlock could be tested in specially tailored targets like school transport and transport of dangerous goods. Sweden already has experience with interlock use in professional transport.

8.2.1. Application procedures

According to the literature review there are several alternatives for setting the **BAC threshold** (fail level) for interlock use in the EU. One is 0.5 g/l, which is the legal limit in most EU countries. The fact in favour of the 0.5 g/l BAC threshold is the acceleration of accident risk increase above it. If the interlock is to be a tool for helping to teach sober driving, 0.2 g/l or even 0 g/l would be appropriate BAC thresholds. In BAIID programmes combined with rehabilitation, 0.2 g/l or even 0 g/l BAC thresholds would be the best alternatives. Because of the possibility for false alarms caused by food containing alcohol 0.2 g/l would be better than 0 g/l. To conclude, we recommend the *0.2 BAC threshold as the best alternative* for field trials of the interlocks in the EU.
There are some **medical procedures** which should be included in the EU BAIID programme. A certificate from a specialist physician should be attached to the application form. Because of the variation in legislation and attitudes to drug use in EU countries, the decision whether someone with a history of drug or mixed use is capable of attending an interlock programme in the EU, should be a national decision. However, it is recommended that drug dependent persons be excluded from the BAIID programme in EU.
The user of the interlock is usually responsible for almost all **the costs of using the device**. Some cost subvention of rehabilitation is recommended in order to make use of the interlock more attractive. Another incentive could be to shorten the driving suspension through voluntary participation in a BAIID programme. This incentive is used in Alberta, Canada, and is recommended only in countries with long driving suspension because of DUI.

8.2.2. Other countermeasures with interlock

It is recommended that some kind of rehabilitation be combined with use of the alcohol interlock to also reduce drink-driving recidivism after the interlock period. Psychological intervention is recommended as a minimum requirement for field trials in the EU; complete medical intervention is not, because combining a medical approach with the educational-psychological one is not easy. Besides, medical intervention increases the costs of the interlock use substantially. It is possible that the best results would be achieved by regular rehabilitation intervention during the BAIID period and by having some requirements at the end of the programme. However, cost of the rehabilitation should not be a disincentive to participation. Research and experience from Canada also suggest that the ideal duration of participation in an interlock programme should be variable depending on the performance of the individual in the programme (Marques et al. 2000a).

At least in countries having relatively long driving suspension periods for DUI offences, rehabilitation can be undertaken at regular intervals during the interlock period. Another possibility is to start rehabilitation before the interlock period. A better alternative, however, is to set some rehabilitation requirements at the end of the interlock period, as in the Swedish model, in order to maintain the combined effects of rehabilitation and interlock use following interlock removal. An option for the extended interlock period or an interlock period depending on performance of the individual during the programme should be considered nationally.

8.2.3. Social acceptance of interlock programmes

Results of the acceptance studies show a discrepancy between considerable public acceptance of interlock programmes and the fact, that only a minority of convicted DUI offenders actually take part in BAIID programmes. Some reasons for and possible approaches to increase participation are described in the following paragraphs.

Obviously, the perceived disadvantages (costs, reluctance, embarrassment etc.) of using a BAIID are so strong, that it is difficult to motivate participation by cost reduction only.

One possibility to increase attractiveness is to adapt participation costs to the costs for alternative sanctions. Ways for realisation could be subsidy, lower monthly rates for the participant in a longer time period (possibly exceeding the programme duration) etc. The programme itself could probably be made attractive by making conditions transparent and easy to understand. Furthermore, good access to service points for training, maintenance, medical checks etc. should be guaranteed to decrease reluctance. An accompanying information campaign to promote the measure is recommended as well, especially when an interlock programme has just been implemented. Information on the programme should explain the conditions and procedures of participation in a positive way, i.e. the 'gains' for the participant should be pointed out (e.g. being mobile, shorter suspension periods etc.).

Additionally, during the programme, individual developments regarding drinking-and-driving behaviour should be monitored and programme process (e.g. duration, additional measures etc.) should be adapted accordingly. In terms of success and motivation, accompanying educational/psychological measures seem an important factor and consequently can be expected to contribute to acceptance in a positive way.

8.3. Legal requirements and limitations

A survey on legal provisions for interlock programmes was conducted in eleven European countries. Ten countries returned the completed questionnaire. Generally, the results indicate high interest in interlock programmes. Four countries are currently preparing a national field trial on interlocks. However, the proposed frame conditions and legal requirements for the implementation of interlock programmes in Europe vary widely. Especially legal aspects do not seem to have been thoroughly investigated in Europe. Bearing this in mind, interpretation of the answers and recommendations must be tentative. Still the results may provide first ideas on conditions for an introduction of interlock programmes in Europe.

Additionally, an examination of (legal) frame conditions was made of countries having already implemented interlock programmes. Results include information on programmes in Australia, Canada, Sweden, and the USA. While in Queensland, Australia and in Sweden interlock programmes are still in a pilot phase, Canada and the US provide interlock programmes as a regular measure for DUI offenders. Two Canadian provinces run interlock programmes: the Alberta programme provides mandatory and voluntary participation, whereas the Quebec programme is only voluntary. In the US, legislation of 42 states allows interlocks (21 of them provide mandatory interlock programmes).

Conclusively, the following recommendations can be derived from the survey regarding frame conditions and legal requirements for an interlock programme field trial in Europe:

- According to the results of the European survey it is conceivable that interlock programmes can be integrated in existing systems of sanctions for DUI offences. For example, they could substitute license withdrawal/unconditional driving bans, respectively shorten the suspension period. Furthermore, they could be implemented in addition to other rehabilitation and/or punitive measures (driver improvement, fines etc.). It is recommended that interlock programme trial(s) be carried out in accordance with and accompanying the existing systems of sanctions for DUI offences. DUI offenders who participate in the programme should be offered incentives to motivate participation (e.g. reduced time of hard suspension, earlier re-instatement of driving privileges).

- Interlock programme trial(s) should predominantly be a measure of specific prevention, i.e. the target group should be DUI offenders. The decision whether first offenders and/or recidivist offenders should be included is expected to depend on the nationally established treatments for the different groups of DUI offenders.

- Interlock programme trial(s) for DUI offenders should be user-paid, meaning that the participant pays the device (possibly in the form of a rental scheme), its installation and service, medical checks etc., as those costs can be justified if the driver benefits from participation (see above). However, alternative models of financing should be discussed, e.g. public grants for needy participants, cost splitting between participant and public sources/supplier.

- Administration of interlock programmes should be done by executive authorities in charge of traffic safety issues. As the responsibility for such tasks depends on the individual national system of legislation, questions regarding the administration of interlock programmes will have to be regulated individually within the participating countries.

- Assuming that interlock programmes are primarily used as a tool for learning to drive soberly, and to separate drinking and driving (i.e. specific prevention), a BAIID fail level of 0 g/l BAC would be the best alternative. However, to allow some measurement tolerance (e.g. for food containing alcohol), and thus to reduce false alarms, a BAIID fail level of 0.2 g/l is recommended for the European interlock field trials.

- From a legislative point of view, voluntary interlock programmes are supposed to be easy to implement, while mandatory programmes are assumed to require changes in legislation (especially in traffic law). Legal aspects concerned with interlock programmes are mostly foreseen for issues of license suspension and re-instatement and in technical requirements of the BAIID. A Review of the examples of currently operational interlock programmes, shows that both voluntary and mandatory programmes require changes in legislation.

8.4. Design of an EU field trial

When designing a BAIID field trial, two types of BAIID use have to be distinguished: commercial use, mainly by professional drivers, and use by convicted DUI offenders. Evaluations of the effects of each type of BAIID use require specific experimental designs.

8.4.1. Target groups

Possible target groups for commercial BAIID programs are tour operators, (local) bus companies, dangerous goods or heavy freight transport companies, taxi companies, or driving schools. The actual use of BAIIDs by the drivers involved should be compulsory.

Due to the great variety in sanctions for driving under the influence of alcohol in the various EU-countries, it is not recommended to define one or more target groups for mandatory BAIID programs in terms of offender types, like first- or second-time offenders etc, but in terms of the sanctions imposed. In that case, the definition of target groups could be related to the sanctions of licence suspension (imposed by the court) and/or mandatory rehabilitation/driver improvement courses (imposed by the licensing authority).

The most realistic target group for an EU BAIID experiment is probably that of DUI offenders who have had a period of mandatory BAIID use imposed by the courts, as an alternative for a period of hard licence suspension. If these drivers also have to follow a rehabilitation

course (and in some EU-countries this will be the case for nearly the entire group), it is recommended to find ways of combining the two.

In order to stimulate BAIID programme participation by DUI convicts, it seems to be advisable to avoid a preceding standard hard suspension period. Preceding hard suspension periods should preferably be restricted to very serious DUI cases.

8.4.2. Duration of experimental BAIID programme

BAIID installation in commercial vehicles, like buses, taxis or heavy freight vehicles, should cover the whole experimental period, since it is intended to be a permanent measure.
The period of BAIID use by DUI offenders imposed by the courts, might be linked to the period of probationary licence suspension that it is combined with.

8.4.3. Some characteristics of an experimental BAIID programme

BAC threshold
For practical reasons already explained in the previous sections, a BAC from 0.2 g/l is recommended for both mandatory and voluntary BAIID programmes.

Installation of an emergency by-pass switch
It seems advisable to install an emergency by-pass switch in the vehicles involved in an EU field trial, and to evaluate legitimate and illegitimate use.

Technical requirements
It does not seem necessary for all EU-countries that the devices function accurately up to a height of 3,500 metres, for instance, or within a temperature range of -45 to +85° C.

8.4.4. Experimental designs to evaluate the effects of BAIID programmes

Evaluation of commercial BAIID programmes
The design of a commercial BAIID experiment should be aimed at evaluating the effect of BAIID use on the BrAC distribution of the drivers involved. The design can be relatively simple: a pre-test and post-test (= during BAIID use) with control group. The experimental group should contain at least 100 vehicles, and a substantial part of these should be easily retrievable for breath-testing of the drivers.
The duration of an EU field trial of commercial BAIID use would be at least two years:
- (preparation of) BAIID installation: three months;
- pre-test data collection: nine months;
- post-test data collection: nine months;
- analysis and reporting: three months.

Evaluation of BAIID programmes by DUI offenders
The design of a BAIID experiment with DUI offenders should be aimed at evaluating the effect of BAIID programmes on recidivism and, if possible, accident rates. Based on the results of the latter evaluation, a cost-effectiveness analysis could be made.
The experimental group might consist of DUI convicts who have had a BAIID programme imposed or offered by the courts, as an alternative for hard licence suspension. An important advantage of taking this entire group, instead of the subgroup that is actually participating in a BAIID programme, is that the problem of self-selection can be avoided.
The control group should then consist of DUI convicts who have had a hard suspension period imposed in an area where the alternative of a mandatory BAIID programme was not available.

The experimental group should contain at least 500 actual BAIID programme participants; the control group might contain approximately 1000 DUI offenders who have had a period of hard licence suspension imposed.
Recidivism rates should be compared both during and after treatment in order to assess the long-term effects, preferably by means of survival analysis. This kind of analysis makes it possible to account for competing hazards, like hospitalisation, death or imprisonment of the drivers involved.

If the experimental group would consist of DUI convicts who are following a mandatory rehabilitation course with integrated BAIID programme, the control group would consist of DUI convicts who are only following a mandatory rehabilitation course. With this design the same conditions, with respect to comparability of the two groups, are applicable as in the design for DUI convicts who have had a BAIID imposed or offered by the courts.

The duration of an EU field trial of mandatory and voluntary BAIID use would be approximately four and a half years:
- inclusion period: six months;
- experimental period: two years;
- post-experimental period: one year;
- data collection, analysis and reporting: one year.

If a rehabilitation course is integrated in the BAIID programme, extension of the post-experimental period with one year may be interesting.

8.5. Possible participants in a field trial

One of the goals of this feasibility study was to find out which European countries are actually interested in participating in a European field trial on alcohol interlocks. Therefore, a question about this topic was included in the questionnaire for European countries. Also an international workshop was held at SWOV, on June 11th, 2001. The purpose of the workshop was mainly to exchange knowledge on alcohol interlocks between experts of several EU countries. In addition, it was discussed which countries were interested in carrying out a practical experiment with alcohol interlocks. During the workshop, presentations about the provisional conclusions of the feasibility study were given. Swedish and Canadian researchers gave presentations about experiences with interlocks in their countries. Manufacturers of interlocks were present to answer detailed technical questions about the interlocks. Furthermore, there was a great deal of discussion about the pros and cons of alcohol interlocks and about the possibilities and difficulties of a practical experiment in various EU countries. A more detailed report of the workshop is given in Annex 8, 9 and 10.

On the basis of both the questionnaire and the workshop we found four countries which, in principle, were willing to participate in a large-scale field trial. Belgium, France, the United Kingdom and the Netherlands indicated that participation was a very serious option. Furthermore, four countries (Spain, Finland, France, and the United Kingdom) had already considered the implementation of interlocks on the basis of a field or pilot trial. During the workshop these countries expressed the intention to adapt their trials as much as possible to a potential European field trial. However, on the basis of the workshop and the questionnaire, it can be concluded that the political (and official) thinking in the European countries about alcohol interlock is still in an explorative phase. This feasibility study led to a better understanding of the legal and practical issues in general, that have to be solved before a field trial is possible in Europe. For most countries, however, it is still largely unknown which detailed legal, practical and financial arrangements have to be made in their own country, in order to be able to participate in a field trial. Therefore the willingness of the countries to join

is provisional. A definite 'yes' can only be given when a detailed plan for a field trial is available. Because of the large difference between the various countries, it is not possible to draw up a detailed plan for a European field trial. Each participating country will itself have to plan the details about necessary changes in legislation, possible size of the experimental and control group and exact costs of the field trial.

Due to the great variety in sanctions for driving under the influence of alcohol in the various EU countries it would be an advantage if an experiment could be conducted both in a country with relatively light DUI sanctions (target group of relatively severe offenders) and in one with relatively severe sanctions (target group of relatively light offenders). A significant reduction of DUI recidivism among severe offenders, however, will be more beneficial for road safety than a reduction among light offenders. Furthermore, a comparison between BAIID programmes with and without integrated rehabilitation would be useful.

8.6. Continuation after this feasibility study

As stated before, it is not possible to draw up a detailed plan for a European field trial, because of the large differences in, amongst other things, legislation between the EU countries. However, in this report a global design for a field trial is given. In this paragraph, a step-by-step scheme is given about the arrangements that have to be made before an EU field trial can actually take place.

First, we suggest appointing one country as co-ordinator for this follow-up programme. Other countries, which are seriously interested in participating in the field trial, can contact this co-ordinator. In Annex 12 a list of minimum standards for the practical experiment is given. Each interested country has to prepare a detailed implementation plan and an evaluation study which meets these minimum standards. The detailed blueprint will vary per country on issues such as adaptation of legislation, costs, executives of the implementation and evaluation etc. The co-ordinating country will put the various detailed implementation and evaluation plans together in one general proposal.

On the basis of the current feasibility study we do not have enough insight in the costs of a field trial in the EU. Costs are very much dependent on the way of implementation, which will differ per country. Comparing countries with alcohol interlock experience, the costs seem to differ from country to country. Although we can not predict the costs for an EU trial in detail, it seems to be obvious that they will exceed the financing possibilities of the member states. For that reason the above mentioned general proposal will be submitted to the European Commission in order to apply for a grant.

The implementation plan and the evaluation study will be carried out by the various countries themselves. Each country makes its own report(s) of the evaluation study. A co-ordinating country (which is not necessarily the same country that co-ordinated the proposal) will assemble the reports of the various countries in a final report and will compare the studies of the EU member states.

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ANNEXES 1 TO 12

1. Picture of a Breath Alcohol Ignition Interlock Device (BAIID)
2. Alcolock trials in Sweden
3. Directive on driving licences
4. Questionnaire: Test with two interlock models at SWOV and VTT
5. Questionnaire: Legal requirements interlock-inexperienced countries
6. Questionnaire: Legal requirements interlock-experienced countries
7. List of respondents having answered the legal requirements questionnaire
8. Description of the planned pilot trials on interlocks in Europe
9. Report of the Alcolock workshop on June 11th, 2001 at SWOV
10. List of participants of the workshop
11. Transparencies of the workshop
12. Minimum standards for an EU field trial on alcohol interlocks

ANNEX 1. Picture of a Breath Alcohol Ignition Interlock Device (BAIID)

ANNEX 2. Alcolock trials in Sweden

Hitomi Shibuya (DTF)

In Sweden there are currently two pilot projects that involve application of alcohol ignition interlock (alcolock) being conducted. The first trial is a demonstration project in which a number of transport companies (taxi, bus, goods transport) voluntarily install alcolocks in some or all of their vehicles as part of their efforts in quality assurance of their products. The project is coordinated by Swedish National Road Administration (SNRA, 'Vägverket' in Swedish) and includes 300 vehicles.

The second project, also coordinated by SNRA, is a trial in which some of those, whose licences are revoked due to their drink-driving offences are permitted to retain the possibility to drive, on the condition that they have alcolocks installed in their vehicles. In the following paragraphs this trial is reviewed in detail.

Background

Every year around 10,000 drivers in Sweden have their licenses revoked due to their drunk driving offences. The length of the revocation period often exceeds 12 months, in which case the offender must pass a new test for a driving license and a new adequacy test in order to have the licence re-granted.

Revocation of a driving license in Sweden is administrated as a traffic safety measure, not as a punishment. Those offenders for whom job driving is a prerequisite, however, find revocation of their driving license a severe sanction. Lack of possibility to drive can mean unemployment, which can lead to social isolation, which in turn might lead to alcohol abuse. Revocation of driving licenses therefore might create a vicious circle. Around 30 % of drunk driving offenders repeat their offences within a few years.

Installation of alcolocks in vehicles of drunk driving offenders might open a possibility to permit the offenders to continue to drive and thus to keep their jobs without compromising traffic safety.

National policy, law, and regulations

The initiation of the pilot project goes back to December, 1993, when the Swedish Government requested SNRA to submit a proposal as to how installation of an alcolock might be implemented as an optional traffic safety measure with respect to drunk driving offenders. SNRA submitted the first proposal in March, 1994 and a revision in March, 1995. After consultation with relevant authorities it was decided in October, 1996 that a pilot project would be started, in which some of those drunk driving offenders who would have their licences revoked would be permitted to retain the possibility to drive on the condition that they had alcolocks installed in their vehicles.

As revocation of driving licences from drink-driving offenders is a legal provision, it was necessary to create a new law in order to implement the pilot project. The Swedish parliament passed the new law in March, 1998. The law went into effect in October, 1998. The law specifies the following:

- the geographical areas for the pilot project
- the length of the pilot project
- the conditions for participation
- the requirements for the participants
- the length of conditional granting
- which authority decides how the costs should be covered
- what happens when a participant quits or is excluded

Based on the law, SNRA issued various regulations as to the details of the pilot project.

Pilot project

In the pilot project some specific drink-driving offenders are permitted to retain the possibility to drive on the condition that they have alcolocks installed in their vehicles and that they fulfil a number of requirements.

Envisaged effects
It was envisaged that the pilot project achieve two goals. Firstly, that the offenders would refrain from driving under the influence of alcohol. Secondly, that their drinking habit would be modified so that they would lead a sober life.

Period
The pilot project started in February, 1999 and will run to 2004.

Geographic areas
The pilot project is being conducted in three prefectures in Sweden: Stockholm, Västerbotten, and Östergötland.

Organisation
The pilot project involves a number of institutes/authorities and is coordinated by SNRA. For each of the three prefectures the prefectural government is in charge of administration, and a local hospital is involved for medical examinations. For all three prefectures an authorised vehicle inspection agency (AB Svensk Bilprovning) is in charge of technical controls.

Alcolock
Once an alcolock is installed in a vehicle, the driver must produce a breath sample to the alcolock in order to start the vehicle. In case the alcohol concentration in the driver's breath is higher than 0.10 g/l BAC, the alcolock will disable the ignition system of the vehicle. At a random interval, while driving, the driver is prompted to produce another breath sample, which the driver must do within three minutes. By analysing characteristics of the breath samples and the way they are produced the alcolock can detect if somebody else than the participant has produced the breath samples. The alcolock is equipped with a memory system that stores all information of the participant's performance including possible irregular actions.

Participants
Those who are registered in one of the three prefectures and have their driving licences revoked, due to their drunk driving offences, have the possibility to apply for participation in the pilot project. As part of the application procedures each applicant has to have a medical examination, which includes a blood sample test, a urine sample test and examination of general physical and mental conditions, at a specified hospital.

The prefectural government is responsible for deciding whether to grant participation to each applicant. Participation is not granted to those who are found medically unfit to drive or to those who are found to be consuming other drugs than alcohol. Those with a minor or severe problem of alcohol abuse, on the other hand, can participate.

Participation in the pilot project has no implications for execution of legal punishments (fine/imprisonment) that resulted from drunk driving offences.

Number of participants
It was originally expected that the number of participants in the first year would be around 260 (200 in Stockholm, 20 in Västerbotten, and 40 in Östergötland). It has been shown,

however, that drivers' interest in participation is somewhat smaller than envisaged. In January, 2001, 2 years after the start of the trial, the total number of participating offenders was around 190. Around 170 (90 %) of them are still participating and the rest (around 20, 10 %) have been excluded.

Conditional re-granting of driving license
Participants in the pilot project have driving licenses re-granted, on the condition that they declare their willingness to meet the specified requirements. (The requirements are described in some detail in the next section.) The conditional re-granting of their driving licence gives each participant the right to drive one particular vehicle, in which an alcolock is installed, only inside Swedish territory.

Conditional re-granting period
The length of the period of conditional re-granting of driving licences is two years.

Requirements
Each participant must meet three types of requirements: technical requirements, medical requirements, and economic requirements.

Technical requirements
Each participant must have an alcolock installed in a vehicle at a specified agency, and must declare that he or she will use the alcolock as instructed. The participant must declare that he or she will not drive any other vehicles than the one in which an alcolock is installed during the period of conditional re-granting. Every 18th week the participant must have the alcolock checked at the specified agency. In the check-up the content of the memory of the alcolock is transferred for analyses.

In case the participant fails to produce a breath sample within three minutes after prompting, while driving, the participant must have the vehicle checked by the specified agency within five days. Otherwise the alcolock will disable the vehicle to start.

Medical requirements
Each participant must have a medical examination every three months at a specified hospital. In the second year the general alcohol consumption by the participant must be at most at a moderate level, which is checked at medical examinations.

Economical requirements
Each participant must pay all the costs, the total of which for a 2-year long conditional re-granting period would amount to around 40,000 SEK (€4,500). Details of the costs are as follows.

Application fee	500 SEK	(€ 56)
Medical examination at application	1,250 SEK	(€140)
Administration fee	1,000 SEK	(€112)
Fee for installation of alcolock	1,000 SEK	(€112)
Fee for renting an alcolock per month (including fee for technical checks)	1,000 SEK	(€112)
Fee for a medical examination per 3 months	1,500 SEK	(€168)
Fee for dismantling alcolock	1,000 SEK	(€112)

Failure in completion
Participants can chose to leave the pilot project at any time. Participants will be excluded from the pilot project in case it is observed that they have failed to meet the requirements. In either case the length of the license revocation period is not affected by the offenders' participation in the pilot project.

Successful completion
When a participant has successfully completed the 2-year long conditional re-granting period a new driving licence will be issued without further tests. The new licence gives the driver exactly the same rights the driver as the one that was revoked. It costs 275 SEK (€30).

Costs and benefits
Revocation of a driving licence can mean unemployment to those for whom job driving is a prerequisite. If the original monthly income is 15,000 SEK (€1,678) the loss in income would be 3,000 SEK (€335) per month, as the unemployment insurance covers only around 80 % of the original income. If the original income is higher, the loss would be greater. Participation in the pilot project, on the other hand, costs around 1,700 SEK (€188) per month. Therefore participation in the pilot project would be an economically advantageous alternative to unemployment.

Evaluation

SNRA is co-ordinating an evaluation project of the pilot project, in which medical and technical data from participants in the first years will be analysed.

Objectives
The following questions are addressed in the evaluation project:
1) To which degree are drink-driving offenders willing to have an alcolock installed in their vehicles in order to retain the possibility to drive?
2) Has driving a vehicle with alcolock any effects on prevention of or rehabilitation from alcohol abuse?
3) Is time-limited installation of alcolock sufficient for yielding a long-term effect in preventing drunk driving offenders from repeating the offence?

Design
Originally it was envisaged by SNRA that participants in the pilot project be chosen at random among the applicants so that well-matched control groups could be established within the test areas. This was not possible, however, because the Swedish Ministry of Justice advised that randomness could not be incorporated in law statements. Because of the high costs of participation it was expected that socio-economical factors would play a major role for potential participants. This makes it difficult to conduct an evaluation within the test areas only.

In the current plan for the evaluation project there are two control groups: the first control group comprises those drunk driving offenders who are registered in the test areas but did not apply for participation in the pilot project. The second group comprises those drunk driving offenders who are registered outside the test areas and thus did not have the possibility to apply for participation. Follow-up examinations of the participants will also be conducted.

ANNEX 3. Directive on driving licences

The EC council introduced the directive (91/439/EEC) on the requirements of a driver's licence in 1991. According to the directive driving licences shall state the conditions on which the driver is authorised to drive.

In Annex III minimum standards of physical and mental fitness to drive a power-driven vehicle are defined. The following is stated (p. 25):

'ALCOHOL'

14. Alcohol consumption constitutes a major danger to road safety. In view of the scale of the problem, the medical profession must be very vigilant.

14.1. Driving licences shall not be issued to, or renewed for, applicants or drivers who are dependent on alcohol or unable to refrain from drinking-and-driving. After a proven period of abstinence and subject to authorised medical opinion and regular medical check-ups, driving licences may be issued to or renewed for, applicant or drivers who have in the past been dependent on alcohol.'

'DRUGS AND MEDICINAL PRODUCTS'

15. Abuse:
Driving licences shall not be issued to or renewed for applicants or drivers who are dependent on psychotropic substances or who are not dependent on such substances but regularly abuse them, whatever category of licence is requested.
Regular use:

15.1. Driving licences shall not be issued to, or renewed for applicants or drivers who regularly use psychotropic substances, in whatever form, which can hamper the ability to drive safely where the quantities absorbed are such as to have an adverse effect on driving. This shall apply to all other medicinal products or combinations of medicinal products which affect the ability to drive.

The directive clearly states that those persons having developed a dependency on 'psychotropic substances' such as alcohol, may not be issued a driver's licence, nor may they have their licence renewed. National regulations in European Union countries have usually been revised to meet the requirements set in the directive on the driving licence.

ANNEX 4. Questionnaire: Test with two interlock models at SWOV and VTT

Name of driver: ……

1. Date of trip: …… - …… - 2001
2. Time at start of trip: …... u. …… min.
3. Time at end of trip: …... u. …… min.
4. You used the interlock:
   - ☐ for the 1st time
   - ☐ for the 2nd-5th time
   - ☐ for the 6th time or more
5. You could start the car:
   - ☐ at the 1st attempt
   - ☐ at the 2nd-5th attempt
   - ☐ after more than 5 attempts
   - ☐ not at all (emergency procedure)
6. Did the interlock ask for a 2nd test?
   - ☐ yes; performed …. min. after request
   - ☐ no
7. Did the interlock ask for a 3rd test?
   - ☐ yes; performed …. min. after request
   - ☐ no
8. Was the interlock use inconvenient for you?
   - ☐ no
   - ☐ yes, because
     ……..…

……

……

9. Did you experience negative safety effects?
   - ☐ no
   - ☐ yes, namely
     ……..……..

……

ANNEX 5. Questionnaire: Legal requirements interlock-inexperienced countries

ALCOLOCKS

Alcohol Interlock Implementation in the European Union

A feasibility study
partly funded by the European Commission

Legal Requirements for the Usage of Alcohol Ignition Interlocks in EU Countries

Dear Madam, dear Sir,

The following questionnaire is part of the EU project 'ALCOLOCKS' and addresses to organisations and institutes dealing with legal issues in road traffic of ten European countries (Austria, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Greece, The Netherlands, Spain).

Project organisation

The project 'ALCOLOCKS' was carried out by the following road traffic safety research institutes:

SWOV Institute for Road Safety Research, The Netherlands
BASt Federal Highway Research Institute, Germany
DTF Danish Transport Research Institute (Former **RfT** Danish Council of Road Safety Research), Denmark
VTT Communities and Infrastructure, Finland

Claudia Evers (BASt) and Inger Marie Bernhoft (DTF) are responsible for this part of the project.

Claudia Evers is your contact person for questions concerning the questionnaire (Phone: +49 – (0)2204 43 432)

The EU-project ALCOLOCKS

Alcohol is one of the major contributing factors in road traffic accidents, in particular in accidents with severe consequences. In EU countries, alcohol is a contributing factor in around 20% of the serious and fatal injury accidents (ETSC, 1995[6]). As the majority of EU countries are well aware of the problem, common countermeasures as targeted police enforcement, publicity campaigns and driver improvement courses have resulted in a steady decline in drink-driving in many countries. However, despite the increasing availability and use of efficient and effective measures such as

[6] ETSC (1995). *Reducing traffic injuries resulting from alcohol impairment.* Brussels, European Transport Safety Council.

random and evidentiary breath testing, recent data (Sweedler, 1997[7]) shows that the decline tends to stagnate. A countermeasure that makes drink-driving physically impossible is the alcohol ignition interlock.

What is an alcohol ignition interlock?

An alcohol ignition interlock is a device installed in a vehicle that requires the driver to provide a breath sample every time an attempt is made to start the vehicle. If the driver has a breath alcohol concentration (BRAC) above a specified BRAC threshold value (for countries using BRAC as evidence) or above an equivalent blood alcohol concentration (BAC) threshold value (for countries using only BAC as evidence), the ignition is locked and the vehicle cannot be started. This aims at preventing the drink driver from driving. Drivers are also required to be re-tested at random intervals when travelling. For safety reasons, the ignition is not locked during driving in case of a positive alcohol test or the refusal of testing. Every test result, test attempts and attempts to circumvent the system are electronically recorded and can be listed and analysed with a software programme by an authorised specialist business.

Alcohol ignition interlocks have been introduced in a number of states in the US, in Victoria, Australia, and in Alberta, Canada where they are generally prescribed by courts to drivers who have been convicted for a drink-driving violation. Recently, a pilot project with alcohol ignition interlocks started in Sweden. Finland currently started preparation of a national pilot project.

The EU-wide introduction of alcohol ignition interlocks is a potentially effective measure to reduce the number of drink-driving accidents. However, there is a lack of sufficient knowledge about the actual effect, the technical, legal and social feasibility, the most effective type of application and use of alcohol ignition interlock programmes in EU countries.

The feasibility study ‘ALCOLOCKS’ aims to answer these questions and to define the conditions for implementing alcohol ignition interlock programmes and to define a set up for a field trial in one or more EU countries.

The questionnaire

The following questionnaire aims to establish answers to questions regarding general legal frame conditions and requirements to be considered before a possible introduction of alcohol ignition interlocks in various countries. The answers should reflect the official attitudes in your country regarding alcohol ignition interlocks.

The document is sent to you in an electronic version providing enough space for your comments. If you prefer using a paper version, please add the necessary papers and refer to the question numbers.

The project consortium has sent the questionnaire to one person in each country. We kindly ask you to fill in the questionnaire or to forward it to another person in your country in case you are not able to answer the questions.

[7] Sweedler, B.M. (1997). *The worldwIde decline in drinking-and-driving – where are we now.* In: C. Mercier-Guyon (ed.), Proceedings of the 14th International Conference on Alcohol, Drugs and Traffic Safety. Vol. 3, pp 1205 – 1210. Annency, CERMT.

We kindly ask you to submit the completed questionnaire by **25 March 2001** to the following address:

Electronic version: evers@bast.de
Paper version: Claudia Evers
Bundesanstalt für Straßenwesen
Brüderstrasse 53
D-51427 Bergisch Gladbach

The project consortium thanks you in advance for your kind collaboration!

Questionnaire

1. Name and address of the person who has filled in the questionnaire

Name: .....

Organisation: .....

Post Address:.....

Phone: .....

Fax: .....

e-mail: .....

2. National BAC limits and sanctions

1) What is/are the legal limit/limits in your country?

a) BAC limit .....

b) BRAC limit (if any).....

2) What are the sanctions regarding driving license at various BAC/BRAC levels when committing a drink-driving offence?

(a) According to the law (traffic act)

.....

(b) According to departmental orders

.....

3) What are the legal procedures for re-granting the driving license?

.....

3. National developments regarding alcohol ignition interlocks

1) Is there already a use of technological devices against drink-driving offences (e.g. alcohol ignition interlock, electronic driving license, specific and visible indication of the car) in your country?

☐ no
☐ yes, namely.....
☐ not yet, but under consideration,
namely.....

2) What are the recent considerations for implementing alcohol ignition interlocks in your country?

.....
.....

4. General legal aspects

1) What would be the highest acceptable BRAC/BAC level for calibrating the alcohol ignition interlock?

☐ 0,0 BRAC/equivalent to 0,0 BAC
☐ Legal limit
☐ else, namely.....

2) Is it conceivable that an alcohol ignition interlock be an <u>alternative measure</u> to other sanctions/restrictions?

☐ no
☐ yes, an alcohol interlock could <u>replace</u> the following
sanction(s)/restriction(s).....…
……..

3) Can an alcohol interlock be an <u>additional/accompanying measure</u> to other sanctions/restrictions?

☐ no
☐ yes, an alcohol interlock could <u>accompany</u> the following
sanction(s)/restriction(s).....…
……..

4) Who should be responsible for

a) selecting the drivers participating in an alcohol ignition interlock programme?

.....

b) ordering the use of an alcohol ignition interlock to the individual driver?

.....

c) monitoring/enforcing (non-)compliance with the order for an alcohol ignition interlock?

.....

d) analysing and processing the recorded data of the alcohol ignition interlock?

.....

e) storing and using the data of the alcohol ignition interlock for evidence purposes?

.....

f) ordering sanctions if a driver joining an alcohol ignition interlock programme does not comply with the programme requirements (e.g. driving an unequipped vehicle, system manipulation attempts)?

.....

4.1. Voluntary use

1) For which target group of drivers should the use of an alcohol ignition interlock be <u>voluntary</u>?

☐ none
☐ Novice drivers – which?..... *(please insert)*
☐ First time offenders with a BRAC of ≥ ..... *(please insert)*
☐ First time offenders with a BAC of ≥ ..... *(please insert)*
☐ Recidivist offenders with a BRAC of ≥ ..... *(please insert)*
☐ Recidivist offenders with a BAC of ≥ ..... *(please insert)*
☐ Professional drivers
☐ else, namely.....

2) Who should finance the <u>voluntary</u> use of an alcohol ignition interlock (for each of the following expenses, please state the financial source (e.g. police, national government, local government, the driver, the driver´s company)

a) device .....

b) implementation in the car .....

c) service .....

d) medical examination .....

e) other expenses, namely .....

f) Which <u>advantages</u> do you see in a voluntary alcohol ignition interlock programme?

g) Which <u>disadvantages</u> do you see in a voluntary alcohol ignition interlock programme?

.....

3) Which legal aspects of your country should be taken into account when planning an alcohol ignition interlock programme on a <u>voluntary</u> basis?

a) Aspects of <u>traffic law</u>

.....

b) Aspects of <u>criminal law</u>

.....

c) Aspects of liability law

.....

d) Aspects of insurance law

.....

e) Other legal aspects

.....

4) Would it be possible to integrate an alcohol ignition interlock programme on a voluntary basis without changing the current legislation in your country?

☐ yes
☐ no

a) If 'no': In which points would legislation need to be changed in your country?

.....

5) Should there be any incentive for drivers participating voluntarily in an alcohol ignition interlock programme?

☐ no
☐ yes, namely.....

4.2. Mandatory use

1) For which target group of drivers should the use of an alcohol ignition interlock be mandatory?

☐ none
☐ Novice drivers – which?..... ..... *(please insert)*
☐ First time offenders with a BRAC of ≥ ..... *(please insert)*
☐ First time offenders with a BAC of ≥ ..... *(please insert)*
☐ Recidivist offenders with a BRAC of ≥ ..... *(please insert)*
☐ Recidivist offenders with a BAC of ≥ ..... *(please insert)*
☐ Professional drivers
☐ else, namely.....

2) Who should finance the mandatory use of an alcohol ignition interlock (for each of the following expenses, please state the financial source (e.g. police, national government, local government, the driver, the driver´s company)

a) device .....

b) implementation in the car .....

c) service .....

d) medical examination .....

e) other expenses, namely .....

3) Which advantages do you see in a mandatory alcohol ignition interlock programme?

.....

4) Which disadvantages do you see in a mandatory alcohol ignition interlock programme?

.....

5) Which legal aspects of your country should be taken into account when planning an alcohol ignition interlock programme on a mandatory basis?

a) Aspects of traffic law

.....

b) Aspects of criminal law

.....

c) Aspects of liability law

.....

d) Aspects of insurance law

.....

e) Other legal aspects

.....

6) Would it be possible to integrate an alcohol ignition interlock programme on a <u>mandatory</u> basis without changing the current legislation in your country?

☐ yes
☐ no

7) If 'no': In which points would legislation need to be changed in your country?

.....

8) What should be the legal consequences if a driver obliged to use an alcohol ignition interlock does not comply with this obligation (e.g. driving an unequipped vehicle, system manipulation attempts)?

.....

5. Participation in an international pilot trial

1) On 11 June 2001 an expert meeting will be held at SWOV to discuss the possibilities and conditions of an international alcohol ignition interlock field trial. Is there interest to participate in this meeting?

☐ no
☐ yes, please address to the following person to be invited to the expert meeting

Name:.....

Organisation:.....

Post Address:.....

Phone:.....

Fax:.....

e-mail:.....

2) Is there interest in your country to participate in the field trial?

☐ no, we are not interested
☐ yes, we would be interested
☐ we do not know yet, but please keep us informed of the possibilities

6. Further comments

Please use this space for any further comments.

.....

.....

.....

.....

.....

Thank you for your kind collaboration!

ANNEX 6. Questionnaire: Legal requirements interlock-experienced countries

ALCOLOCKS

Alcohol Interlock Implementation in the European Union

A feasibility study
partly funded by the European Commission

Legal Requirements for the Usage of Alcohol Ignition Interlocks in EU Countries

Dear Madam, dear Sir,

The following questionnaire is part of the EU project 'ALCOLOCKS' and addresses to organisations and institutes of countries having experiences with alcohol ignition interlock programmes.

Project organisation

The project 'ALCOLOCKS' is carried out by the following road traffic safety research institutes:

SWOV Institute for Road Safety Research, The Netherlands
BASt Federal Highway Research Institute, Germany
DTF Danish Transport Research Institute (Former **RfT** Danish Council of Road Safety Research), Denmark
VTT Communities and Infrastructure, Finland

Claudia Evers (BASt) and Inger Marie Bernhoft (DTF) are responsible for this part of the project.

Claudia Evers is your contact person for questions concerning the questionnaire (Phone: +49 – (0)2204 43 432)

The EU-project ALCOLOCKS

Alcohol is one of the major contributing factors in road traffic accidents, in particular in accidents with severe consequences. In EU countries, alcohol is a contributing factor in around 20% of the serious and fatal injury accidents (ETSC, 1995). As the majority of EU countries are well aware of the problem, common countermeasures as targeted police enforcement, publicity campaigns and driver improvement courses have resulted in a steady decline in drink-driving in many countries. However, despite the increasing availability and use of efficient and effective measures such as random and evidentiary breath testing, recent data (Sweedler, 1997) shows that the

decline tends to stagnate. A countermeasure that makes drink-driving physically impossible is the alcohol ignition interlock.

The EU-wide introduction of alcohol ignition interlocks is a potentially effective measure to reduce the number of drink-driving accidents. However, there is a lack of sufficient knowledge about the actual effect, the technical, legal and social feasibility, the most effective type of application and use of alcohol ignition interlock programmes in EU countries.

The feasibility study 'ALCOLOCKS' aims to answer these questions and to define the conditions for implementing alcohol ignition interlock programmes and to define a set up for a field trial in one or more EU countries.

The questionnaire

The following questionnaire aims to establish answers to questions regarding general legal frame conditions and requirements to be considered before a possible introduction of alcohol ignition interlocks in various European countries. The answers should reflect the official conditions in your country regarding alcohol ignition interlocks.

The document is sent to you in an electronic version providing enough space for your comments. If you prefer using a paper version, please add the necessary papers and refer to the question numbers.

The project consortium has sent the questionnaire to a few persons, see addresses in the email. We kindly ask you to fill in the questionnaire or to forward it to another person in your country in case you are not able to answer the questions. If you forward the questionnaire to another person, please inform evers@bast.de and imb@dtf.dk.

We kindly ask you to submit the completed questionnaire by **20 April 2001** to the following address:

Electronic version:	evers@bast.de
Paper version:	Claudia Evers Bundesanstalt für Straßenwesen Brüderstrasse 53 D-51427 Bergisch Gladbach Germany

The project consortium thanks you in advance for your kind collaboration!

Questionnaire

1. Name and address of the person who has filled in the questionnaire

Name: .....

Organisation: .....

Post Address: .....

Phone: .....

Fax: .....

e-mail: .....

2. National BAC limits and sanctions

1) What is/are the legal limit/limits in your country?

a) BAC limit .....……

b) BRAC limit (if any) .....……..

2) What are the sanctions regarding driving license at various BAC/BRAC levels when committing a drink-driving offence?

a) According to the law (traffic act)

.....

b) According to departmental orders

.....

3) What are the legal procedures for re-granting the driving license?

.....

3. General aspects of the alcohol ignition interlock programme

1) When was the interlock programme first implemented in your country?

a) As a pilot or field trial: **.....**

b) As a regular measure: **.....**

2) Is alcohol ignition interlock in your country

☐ voluntary (if only voluntary, please leave section 3.2 out)
☐ mandatory (if only mandatory, please leave section 3.1 out)
☐ both, voluntary and mandatory

3) Size of the programme

a) number of participants (per year) **.....**

b) the programme is implemented

☐ nationwide
☐ implemented in .....of ..... counties/provinces/states

4) What is the BRAC/BAC level for calibrating the alcohol ignition interlock in your country?

☐ 0,0 BRAC/equivalent to 0,0 BAC
☐ Legal limit
☐ else, namely.....

5) Is the alcohol ignition interlock used as an <u>alternative measure</u> to other sanctions/restrictions?

☐ no
☐ yes, an alcohol interlock <u>replaces</u> the following sanction(s)/restriction(s)

.....

6) Is the alcohol interlock used as an <u>additional/accompanying measure</u> to other sanctions/restrictions?

☐ no
☐ yes, an alcohol interlock <u>accompanies</u> the following sanction(s)/restriction(s)

.....

7) Who is responsible for:

a) selecting the drivers participating in an alcohol ignition interlock programme?

.....

b) ordering the use of an alcohol ignition interlock to the individual driver?

.....

c) monitoring/enforcing (non-)compliance with the order for an alcohol ignition interlock?

.....

d) analysing and processing the recorded data of the alcohol ignition interlock?

.....

e) storing and using the data of the alcohol ignition interlock for evidence purposes?

.....

f) ordering sanctions if a driver joining an alcohol ignition interlock programme does not comply with the programme requirements (e.g. driving an unequipped vehicle, system manipulation attempts)?

.....

3.1. Voluntary use (please leave this section out if there is only mandatory use)

1) For which target group(s) of drivers is use of an alcohol ignition interlock voluntary in your country?

.....

2) Who finances the voluntary use of an alcohol ignition interlock? (for each of the following expenses, please state the financial source (e.g. police, national government, local government, the driver, the driver´s company)

a) device .....

b) implementation in the car .....….

c) service .....

d) medical examination .....….

e) other expenses, namely .....….

3) Which legal aspects of your country are concerned with respect to alcohol ignition interlock programmes on a <u>voluntary</u> basis?

a) Aspects of <u>traffic law</u>

.....

b) Aspects of <u>criminal law</u>

.....

c) Aspects of <u>liability law</u>

.....

d) Aspects of <u>insurance law</u>

.....

e) Other legal aspects

.....

4) Was it possible to integrate an alcohol ignition interlock programme on a <u>voluntary</u> basis without changing the current legislation in your country?

☐ yes
☐ no

a) If 'no': In which points were changes in legislation necessary?

.....

5) Is there any incentive for drivers participating voluntarily in an alcohol ignition interlock programme?

☐ no
☐ yes, namely.....

6) Which positive experiences did you make with voluntary alcohol ignition interlock programmes?

.....

7) Which negative experiences did you make with voluntary alcohol ignition interlock programmes?

.....

3.2. Mandatory use (please leave this section out if there is only voluntary use)

1) For which target group(s) of drivers is the use of an alcohol ignition interlock mandatory in your country?

.....

2) Who finances the mandatory use of an alcohol ignition interlock? (for each of the following expenses, please state the financial source (e.g. police, national government, local government, the driver, the driver´s company)

a) device .....

b) implementation in the car .....

c) service .....

d) medical examination .....

e) other expenses, namely .....

3) Which legal aspects of your country are concerned with respect to alcohol ignition interlock programmes on a mandatory basis?

a) Aspects of traffic law
.....

b) Aspects of criminal law
.....

c) Aspects of liability law
.....

d) Aspects of insurance law
.....

e) Other legal aspects
.....

4) Was it possible to integrate an alcohol ignition interlock programme on a <u>mandatory</u> basis without changing the current legislation in your country?

☐ yes
☐ no

a) If 'no': In which points were changes in legislation necessary?

.....

5) What are the legal consequences if a driver obliged to use an alcohol ignition interlock does not comply with this obligation (e.g. driving an unequipped vehicle, system manipulation attempts)?

.....

6) Which <u>positive experiences</u> did you make with <u>mandatory</u> alcohol ignition interlock programmes?

.....

7) Which <u>negative experiences</u> did you make with <u>mandatory</u> alcohol ignition interlock programmes?

.....

4. Participation in a European expert meeting

1) On 11 June 2001 an expert meeting will be held at SWOV, The Netherlands, to discuss the possibilities and conditions of a European alcohol ignition interlock field trial. Is there interest to participate in this meeting?

☐ no
☐ yes, please address to the following person to be invited to the expert meeting

Name:.....

Organisation:.....

Post Address:.....

Phone:.....

Fax:.....

e-mail:.....

5. Further comments

Please use this space for further comments.

.....

.....

.....

.....

.....

Thank you for your kind collaboration!

ANNEX 7. List of respondents having answered the legal requirements questionnaire

1. European countries without interlock programmes

	Country	Name	Organisation
1	A	Stefanie Traxler	Kuratorium für Schutz und Sicherheit (KuSS), Legal Division, Vienna
2	B	Ward Vanlaar	Belgian Road Safety Institute (IBSR), Brussels
3	CZ	Karel Schmeidler Jaroslav Heinrich	Transport Research Centre (CDV), Brno
4	D	Johannes Lagois	Dräger Sicherheitstechnik GmbH, Lübeck
5	DK	Jens Hork	Faerdselsstyrelesen (The Road Safety and Transport Agency), Kopenhagen
6	E	Fermina Sánchez Francisco Jaime Bermúdez Benito-Delgado	Dirección General de Tráfico, Subdirección General de Investigación y Formación Vial, Madrid Grupo Tecnología del Tráfico, Madrid
7	F	Charles Mercier-Guyon Marie Berthe Biecheler-Fretel	CERMT, Annecy INRETS, Arcueil
8	FIN	Otto Kärki Ove Knekt Eija Maunu Jarmo Littunen	Technical Research Centre of Finland (VTT), Espoo Drivers License Register of Finland (AKE), Helsinki Ministry of Transport and Communication, Helsinki Ministry of Justice, Helsinki
9	NL	Aad Hage	Ministry of Transport, Infrastructure and Waterworks, Den Haag
10	UK	Paul Jackson	Department of Environment, Transport and the Regions (DETR), Road Safety Division, London

2. Countries with interlock programmes

	Country	Name	Organisation
1	Australia	Mary Sheehan	Centre for Accident Research and Road Safety – Queensland (CARRS-Q) (Queensland)
2	Canada	Douglas Beirness	Traffic Injury Research Foundation (Ottawa/ON)
3	Canada	Claude Dussault	Société de l'assurance automobile du Québec (Québec/QC)
4	Canada	Ian Marples	Guardian Interlock Systems Corp. (Toronto/ON)
5	Sweden	Bo Lönegren	Swedish National Road Administration, Borlänge
6	USA	Barnie Jones	Oregon Department of Transportation (Salem/OR)
7	USA	Paul Marques	Pacific Institute for Research and Evaluation (Calverton MD)

ANNEX 8. Description of the planned pilot trials on interlocks in Europe

This annex gives short descriptions of the intended pilot trials on interlock programmes in Europe in completion to chapter 6. As mentioned there, four European countries are planning an interlock field trial (Finland, France, Spain, and United Kingdom). However, detailed descriptions on the French and British plans were not available at the time of publication of this report. Thus, this annex refers to the two remaining descriptions of the Finnish and Spanish pilot trials.

1. Finland

Since the beginning of the year 2000, the Technical Research Centre of Finland (VTT) has studied the possibility of implementing a pilot BAIID programme in Finland. The project has been supervised by a project group, with representatives from the Ministry of Transport and Communications, the Ministry of Justice, the Ministry of the Interior, Vehicle Administration and the Finnish Motor Insurers' Centre.

The implementation of the interlock field trial in Finland had not yet been decided upon by the end of October 2001. The decision will probably have been made by the end of 2002. The field trial will be set up in two to three Finnish provinces. VTT estimates that approximately 100 interlocks will be installed at the beginning of the programme. Depending on the results of the prospective field trial, a national interlock programme may be considered.

Participation in the prospective interlock field trial will be voluntary and user-paid. VTT recommends that the interlock be offered to all DUI convicts in the provinces of the prospective trial. The length of the BAIID installation period will probably be equal to the length of the driving suspension period. No hard suspension period will be required. A mandatory interlock programme is not feasible according to present Finnish legislation. In addition, an option of company-paid interlocks to be used by transport companies is recommended. Vehicle Administration has received some inquiries about interlock use in professional transport.

The aim of the prospective field trial is to take stock of the practical aspects or problems regarding BAIID use in Finland. VTT will also recommend combining rehabilitation and BAIID use. Reliable estimates about the effects of BAIID use on recidivism rates are not expected, because of the problem of self-selection and the small volume of the sample. VTT will recommend the fail BrAC level of 0.1 mg/l to be used.

2. France

The French pilot trial is planned to start in two 'départements' (which are courts), however it has not been decided yet where the experiment will take place. The trial phase is planned for a duration of 2-3 years. Target group of the trial will be offenders with a BAC of 0.5 and 0.8 g/l, who are chosen by the 'départements'. Offenders with a past drinking history will perhaps be excluded from participation. Participation will be voluntary, with the offender having the choice of either having an interlock installed or being legally prosecuted. Other sanctions will not be replaced by participating in the programme. The trial will be financed by the French Ministry of Transport and the Ministry of Justice. The latter will also administer the programme. If a participant fails to comply with the programme requirements, s/he will be excluded from further participation and legal prosecution will start. The decision making on further details of the interlock pilots in France was still ongoing at the time of publication of this report.

3. Spain

Since 1999, the Grupo Tecnología del Tráfico (GTT) has been preparing the introduction of a pilot interlock programme, supported by all competent Spanish agencies and organisations with regard to interlocks and road safety.

The trial aims to establish whether a wide scale application of the programme would positively affect road safety and reduce recidivism among convicted drivers. It will be implemented in 2 of 17 autonomous communities. Participation for drinking-driving offenders is voluntary (mandatory participation is not feasible under Spanish law) with selection of eligible participants by juridical decision. Under criminal law, application of interlock devices will emanate from a sentence for a criminal offence against traffic safety. The application of this device will not be admissible in case of additional other crimes pending or additional collateral damages (such as injuries or death). GTT estimates that 300-400 drivers will be reached by the programme (minimum participant number should be 150).

Participants retain their right to drive, and their legal status will be fully re-instated and their criminal record erased upon satisfactory completion of their programme. The fail BAC level of the BAIID used within the programme is 0.5 g/l or 0.25 mg/l BrAC. The police departments and security agencies in charge are responsible for monitoring/enforcing the participants' compliance with the programme requirements. In case of non-compliance, the participant's license will be immediately suspended, he/she will be excluded from the programme and the original sentence will apply. GTT as the service provider will be responsible for processing the recorded data of the interlock. Data analysis will be done by the universities of Valladolid and Valencia for evaluation purposes, whereas the courts use the data for evidence purposes. The programme can be introduced without legislative changes.

The Spanish interlock programme will be user-paid, while financial support by the Justice system is possible on an individual basis. Research and evaluation of the programme is paid by the 'Plan Nacional sobre Drogas' research funds and possibly by an EC co-funding.

4. United Kingdom

At the time of publication of this report, no detailed description of the planned UK interlock pilot trial was available, as the conditions and requirements for the trial were still under discussion. However, the action plan for pushing forward the trial implementation provides, in a first step, for a meeting of DETR, interlock manufacturers and DVLA (the vehicle licensing department) to discuss administrative details and the most suitable groups for consideration. This first step was scheduled for mid/end of September 2001. Afterwards, legal issues of the trial (e.g. experimental legislation that will be required) are supposed to be discussed between DETR and their legal advisers. The outcome of these steps should be a written specification of the trial, which is to be distributed to contractors.

ANNEX 9. Report of the Alcolock workshop on June 11th 2001, at SWOV

On June 11th, 2001 an international workshop concerning Alcohol ignition interlocks was held at SWOV, chaired by Ms. Inger Marie Bernhoft (DTF). The purpose of the workshop was to inform other EU countries about the preliminary results of the feasibility study, to enhance the interest in alcohol interlock usage in Europe and to identify countries that are prepared to participate in a field trial.

At the workshop, the following countries were represented by a researcher specialised in alcohol and traffic safety: Austria, Denmark, France, Germany, Finland, Czech Republic

The following countries were represented by both a researcher and a representative of the Ministry of Transport: Belgium, The Netherlands, Spain,

The United Kingdom was represented by a representative of the Ministry of Transport

Furthermore, an official from the European Commission as well as employees of interlock manufacturers, Dräger (Germany), Guardian (Canada) and Lion (UK) attended the meeting. A researcher from Canada and from Sweden were present to give presentations about the experiences in their countries. An overview of the participants is given in Annex 10.

At the workshop four presentations about the preliminary results of the feasibility study were given. The identification of target groups, an overview of technical equipment, legal requirements and the design of an EU field trial were mentioned in these presentations. In the afternoon Mr. Douglas Beirness from the Traffic Injury Research Foundation in Canada and Mr. Hans Laurell from The Swedish National Road Administration gave an overview of the results and experiences of the implementation of interlocks in their countries. Transparencies of these presentations are included in Annex 11. During the workshop a demonstration of the interlock installed in a SWOV car was given.

The presentations resulted in lively discussions. Amongst other things, it was discussed whether the deterrence by BAIIDs would be less then the deterrence by hard license suspension. The experience in Canada learns that hard license suspension is hardly complied with. An interlock would then be a more severe punishment. A lot of questions were asked about cheating the system. On the basis of the experiences in Canada and Sweden, the conclusion could be drawn that cheating the BAIID system is very difficult. Some participants were afraid of a social stigma for BAIID users. However, in Canada the system is accepted well by family members of the offenders. Another question concerned the responsibility in accidents. The manufacturers stated that no accidents because of the system were known. A major part of the discussion centred around the various legal systems in the EU countries and Canada. It was stressed that the EU trial should differentiate for each country. Some participants missed a clear link with rehabilitation. Some researchers were concerned about the bias (self-selection) in the studies in the USA and Canada. The participants from Canada stressed that the same results were found in a random assignment study. Besides, both voluntary and mandatory BAIID users did well in the programme.

In the afternoon the participants were divided into groups, each of them to discuss one of three questions:
- Do we have to avoid hard suspensions as much as possible in the trial?
- Should we vary the length of the BAIID programme?
- What new information do we want to get from the trial?

The first question was answered positively by the discussion group. Deterrence was seen as an advantage of using hard suspension. As disadvantages were seen: loss of employment and the realisation that driving without a licence is not a big risk. Practical problems concerning the remission of hard suspension, could be the impression of softening of the law and, if a court decision is a necessity, the long period before operation.

The second group was positive about variation of the length of the programme. They were in favour of an 'open end' programme, where the duration of the programme should be dependent on the experiences during the programme. The length of the programme should also be dependent on the length and severity of the original sanction. If the participant fails the programme, the duration of the programme should be lengthened.

Two groups answered the third question. The following new information from the trial was appreciated most:

- information about participants: behaviour (drink-driving habits), attitudes, knowledge about for example BAC values, recidivism rates, misuse potential,
- information about monitoring of the administrative project: work load for authorities,
- information about target groups: most suitable group, differences in target groups, selection (bias),
- effect on traffic safety,
- effect of the combination with other treatments or sanctions,
- social acceptance,
- information about the equipment,
- differences between countries.

ANNEX 10. List of participants of the workshop

Country	Name	Organisation
Austria	Dr. Gregor Bartl	Kuratorium für Schutz und Sicherheit
Belgium	Mr. Guido Baten	Belgisch Institute voor de Verkeersveiligheid BIVV
	Mr. Jean-Marie Nevens,	Ministry of Transport and Infrastructure
Canada	Mr. Douglas J. Beirness	Traffic Injury Research Foundation (TIRF)
	Mr. Ian Marples,	Guardian Interlock Systems
Czech Republic	Mr. Karel Schmeidler	Transport Research Centre Brno
Denmark	Ms. Inger Marie Bernhoft	DTF Radet for Trafiksikkerhedsforskning
EU	Mr. Matthew Kestner	European Commission
Finland	Mr. Otto Kärki	VTT Communities and Infrastructure
	Mr. Ove Knekt	AKE, Vehicle Administration
France	Mrs. Marie-Berthe Biecheler-Fretel	INRETS
Germany	Ms. Claudia Evers	BASt, Bundesanstalt für Straßenwesen
	Dr. Johannes Lagois	Dräger Sicherheitstechnik GmbH
The Netherlands	Ms. Charlotte Bax	SWOV Institute for Road Safety Research
	Mr. Aad Hage	Ministry of Transport DGP
	Mr. René Mathijssen	SWOV Institute for Road Safety Research
Spain	Mr. Francisco Jaime Bermúdez Benito-Delgado	Grupo Tecnología del Tráfico
	Mrs. Fermina Sánchez Martín	Dirección General de Tráfico
Sweden	Mr. Hans Laurell	Vägverket, Swedish National Road Administration
United Kingdom	Dr. Paul Jackson	Dept. of Environment, Transport & Regions DETR, Road Safety Division
	Mr. David Josty	Lion Laboratories Limited

ANNEX 11. Transparencies of the workshop

- Presentation 1: Identification of target group(s) and application procedures
  Otto Kärki

- Presentation 2: Technical requirements regarding the equipment
  Otto Kärki

- Presentation 3: Legal requirements and possibilities in EU countries
  Claudia Evers

- Presentation 4: Design of an EU field trial
  René Mathijssen

- Presentation 5: Best practices for Alcohol Interlock Programmes: Target groups
  Doug Beirness

- Presentation 6: Best practices from Sweden
  Hans Laurell

VTT
Otto Kärki

ALCOLOCKS

Presentation 1

Identification of the target group(s) and application procedures

Aims of the Activity

1) To identify the most suitable target group(s) for alcohol interlocks
2) To define to most appropriate/effective application procedures

To result recommendations regarding:

1) the target groups
2) selection and screening needs and methods
3) the application procedures
4) the need of other countermeasures
5) the most appropriate BAC threshold

ALCOLOCKS, Presentation 1:
Identification of the target group(s) and application procedures

VTT Otto Kärki

Target Groups:

- For which drivers is an interlock appropriate?
  (-> c.f. also results of the European survey in presentation 3)

  Interlock programs should predominantly be a measure for

  1) DUI offenders (recidivists, first offenders with a high BAC)
     a) Recidivists: the most appropriate group (they need it most)
     b) First time with a high BAC: a good group (as a preventive measure)

  2) Professional drivers (buses, heavy vehicles, taxis)
     to specially tailored targets (as a quality assurance measure)

ALCOLOCKS, Presentation 1:
Identification of the target group(s) and application procedures

VTT Otto Kärki

Preliminary conclusions of Activity 2:

1) BAIID use has reduced the number of repeat DUI offences, while installed, by 28–65 % (Voas et al. 1999), even 90 % (Beirness 2001)

2) Once removed, re-offence rates tend to return to pre-interlock levels

ALCOLOCKS, Presentation 1:
Identification of the target group(s) and application procedures

VTT Otto Kärki

Recommendations for Field Trials in Europe:

The Goal should be:

- Identification of combined effects of BAIID use and rehabilitation
- Identification the effects on recidivism

Groups for the Field trial:

- Countries with BAIID use only
- Countries with BAIID use combined with rehabilitation

Selection and screening needs:

- Quasi-experimental assignment more easily feasible
- No screening according to gender, residence, income, profession etc.
- Some emphasis on novice drivers?
- Previous traffic violations other than DUI?
- Drug or mixed use history: national decision (dependent people not allowed)

ALCOLOCKS, Presentation 1:
Identification of the target group(s) and application procedures

VTT Otto Kärki

Social acceptance (BAST):

Conclusions:

- Discrepancy between strong public support and low voluntary participation rates
- Strong perceived disadvantages: costs, reluctance, embarrassment etc.

$\Rightarrow$ only the motivated ones will participate (biased samples)

- Administrative programmes more flexible

Ways to increase attractiveness:

- Adaptating the participation costs to the costs for alternative sanctions
- Minimization of the number of hard suspension periods preceding BAIID use
- The programme features (training, service, support etc.)
- Information campaigns

Recommendations:

- Voluntary interlock trials
- Two-spep approach: mandatory options after the field trials in EU?

Recommendations: Other countermeasures with interlock

- The form of rehabilitation (preliminary recommendations):
  - National differencies should be allowed
  - Complete medical intervention not necessary in most countries
  - Psychological intervention more effective than education
  - Regular intervention recommendable during the BAIID use period
  - Some rehabilitation requirements at the end of BAIID period
  - National decision on linking the BAIID period duration to the success of the individual (fail BACs, rehabilitation) or to the severity of the DUI-offence
- Costs of the rehabilition:
  - Totally user-paid?
  - Effects on acceptance
  - Larger compensations for first time high BAC novice drivers?

VTT
Otto Kärki

ALCOLOCKS

Presentation 2

Technical requirements regarding the equipment

VTT
Otto Kärki

Aims of the Activity

To examine:

- Different technical specifications
- Reliability of the equipment
- Prevention of fraud
- Maintenance issues
- Existing standards
- Technical requirements per target group

ALCOLOCKS, Presentation 2:
Technical requirements regarding the equipment

VTT Otto Kärki

Different technical specifications

1) A semi-conductor device:

Advantages:

- Accuracy
- Relatively low price
- Durability

Primary disadvantages:

- Requires a frequent calibration
- Not alcohol specific

2) A fuel cell device (electrochemical sensor):

Major advantages:

- Specific to alcohol (eliminates the claims of false positives)
- Greater stability

ALCOLOCKS, Presentation 2:
Technical requirements regarding the equipment

VTT Otto Kärki

Existing BAIID standards

1) NHTSA standard:

- The first standards, from the year 1992
- Some anti-circumvention requirements also included

2) Australian standard:

- Designed for the breath alcohol measurement process only
- The strictest in terms of the accuracy of the alcohol measurement

3) Alberta standard:

- Allows alcohol specific devices only (fuel cell)
- Extended temperature requirement (–45…+85 °C)
- The strictest anti-circumvention requirements
- EMI/EMC tests also included
- BAIID must be robust, reliable, stabile

ALCOLOCKS, Presentation 2:
Technical requirements regarding the equipment

Otto Kärki

Usability test of two interlock models

(Dräger interlock by SWOV and Guardian WR2 by VTT)

Purpose of the tests:

•To find out some inconveniences and safety aspects of BAIID usability

Results:

•Test persons who were not sufficiently trained experience difficulties in presenting a valid breath sample (effective anti-circumvention feature)
•Performing a random rolling retest safely requires enough training (while driving or in a simulator),
certain stress may occur while performing it (ergonomics also important)
•Internal auditive signals of both models seemed to be sufficient
•Further testing of BAIID-use safety aspects recommended
•Availability of by-pass element ⇒ more objective information on fail-safety of different BAIID models needed ⇒ availability should be discussed

ALCOLOCKS, Presentation 2:
Technical requirements regarding the equipment

Otto Kärki

Preliminary conclusions of the Activity

Technology:

•Critical factor: ability to distinguish accurately persons above and below the preset threshold BAC
•A data recorder is a key feature to prevent tampering and circumvention (including security of data)
•Anti-circumvention features are a necessary element of BAIIDs
•Reliability and accuracy requirements over an extended temperature range should be required in some countries
•The decision of the BAIID model which will be used in a certain trial in EU should be national but based on the recommendations from the feasibility study

ALCOLOCKS, Presentation 2:
Technical requirements regarding the equipment

Otto Kärki

Recommendations for the BAIID

- **Primary factors to determine the type of device used:**
  - •Cost
  - •Stability
  - •Specific to measurement of alcohol only
  - ⇒ fuel cell device

ALCOLOCKS, Presentation 2:
Technical requirements regarding the equipment

Otto Kärki

Preliminary conclusions of the Activity:

•Other issues:
•The biggest problem of BAIID use (technically impossible to solve): possibility of driving a non-interlock vehicle
•Anti-circumvention features effective against fraud
•Sufficient training with blowing and driving before entering a BAIID programme
•Certain emphasise on usability and ergonomics of the device in a car
•People with health problems: regular medical follow-up

ALCOLOCKS, Presentation 2:
Technical requirements regarding the equipment

VTT Otto Kärki

Preliminary conclusions of the Activity:

•Programme features:
Already suggested:
•Duration of the programme linked to the success of the individual
⇒ National decision
Should be considered:
•Restricting the driving of high risk offenders to certain days and hours at first (tailored trials)

•Technical specifications:
•Different technical specifications to different target groups could be considered but are not recommended

bast

ALCOLOCKS

Presentation 3

Legal Requirements and Possibilities in EU Countries

Claudia Evers
Federal Highway Research Institute (BASt)
Section "Road User Attitudes and Behaviour"
Germany

Aim of Activity "Legal requirements..."

To examine the relevant legal provisions for interlock programmes in

a) **11 European countries**
<u>without</u> interlock programmes

Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, (Greece), Spain, The Netherlands, United Kingdom

What do we need in Europe?

b) **4 countries**
<u>with</u> interlock programmes

Australia, Canada, Sweden,USA

What can we learn from others' experiences?

Note: Brackets indicate that the questionnaire was not returned

ALCOLOCKS

bast

Presentation 3: Legal Requirements and Possibilities in EU Countries

Main Results from the European Survey (1):

- **National developments:**

  4 European countries prepare a national field trial (E, F, FIN, UK).

- **Integration into the national system of sanctions for DUI offences:**

  Interlock programmes could

  a) substitute or shorten the period of license suspension
  b) be implemented in addition to existing punitive and rehabilitative measures.

- **Target groups:**

  Interlock programmes should predominantly be a measure for

  a) DUI offenders (first offenders with a high BAC, recidivists)
  b) professional drivers (bus, taxi).

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bast

Presentation 3: Legal Requirements and Possibilities in EU Countries

Main Results from the European Survey (2):

- **Financing:**

  Programmes should be user-paid (professional drivers: driver's company). Approaches of "mixed" financing (private + public) are conceivable.

- **Administration:**

  Programmes administration should be done by executive authorities of traffic safety (e.g. licensing authorities, courts, rehabilitation organisers).

- **Legislation:**

  Legal aspects predominantly concern

  a) licensing issues (suspension and reinstatement)
  b) technical requirements of the BAIID.

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bast

Presentation 3: Legal Requirements and Possibilities in EU Countries

Recommendations for Field Trials in Europe (1):

(1) Trial(s) should be carried out in accordance with the national existing system of sanctions for DUI offences.

(2) Trial(s) should predominantly be a measure of specific prevention (i.e. target group should be DUI offenders).

(3) There should be an incentive for participation (e.g. reduction of hard suspension time, earlier license reinstatement).

(4) Interlock programmes trial(s) should be user-paid.
However, alternative financing models should be discussed.

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bast

Presentation 3: Legal Requirements and Possibilities in EU Countries

Recommendations for Field Trials in Europe (2):

(5) Programme administration should be done by executive authorities in charge for traffic safety issues (depending on the national legislation).

(6) The fail level of the BAIID should be 0.2 g/l BAC to
a) use the BAIID as an educative tool (for sober driving)
b) allow some measurement tolerance (for e.g. food containing alcohol).

(7) On a national basis, further investigation and clarification of specific legal issues is necessary for the implementation of interlock programmes as a regular measure.

ALCOLOCKS

Design of an EU Field Trail

12-11-01

René Mathijssen

Target groups

- **Voluntary basis: drivers of commercial vehicles**
  - tour operators/(local) bus companies
  - taxi companies/driving schools
  - dangerous goods/heavy freight transport
- **(Semi-)mandatory basis: DUI-convicts**
  - alternative sanction for hard license suspension
  - integral part of rehabilitation course

1

Program characteristics voluntary BAIIDs

- BAIID installed for unlimited period
- fuel-cell; accuracy +/- 5% (at 0.5 mg/l BrAC)
- BrAC-threshold of 0.1 mg/l
- emergency by-pass switch
- enforcement by private companies
- Alberta standard for long-distance transport
- in some countries lower standard possible for local transport

2

Program characteristics mandatory BAIIDs

- varying BAIID installation period (1.5-2 yrs)
- fuel cell; accuracy +/- 5% (at 0.5 mg/l BrAC)
- BrAC-threshold of 0.1 mg/l
- emergency by-pass switch?
- enforcement by probation/licensing authority
- Alberta standard for countries with extreme conditions
- in some countries lower standard possible

3

Experimental design voluntary BAIIDs

- evaluation of effect on BrAC-distribution
- pre- and posttest with control group
- 100-200 BAIID-equipped vehicles
- observations experimental group: 400 pre+400 post
- observations control group: 1000 pre+1000 post
- trial duration of 21 months:
  - data collection pretest: 9 months
  - data collection posttest: 9 months
  - analysis + reporting: 3 months

4

Experimental design mandatory BAIIDs

- evaluation of effect on recidivism (and accidents)
- posttest-only with equivalent groups
- 500-1000 (intended) BAIID-users
- 1000 DUI-convicts with hard licence suspension
- trial duration of 3½-4½ year:
  - ½-year inclusion period
  - 2-year experimental period
  - (1-year postexperimental period)
  - 1 year data collect. + analysis + reporting

5

Best Practices for Alcohol Interlock Programs: Target Groups

Doug Beirness
Vice President Research

A DRIVING FORCE FOR SAFETY

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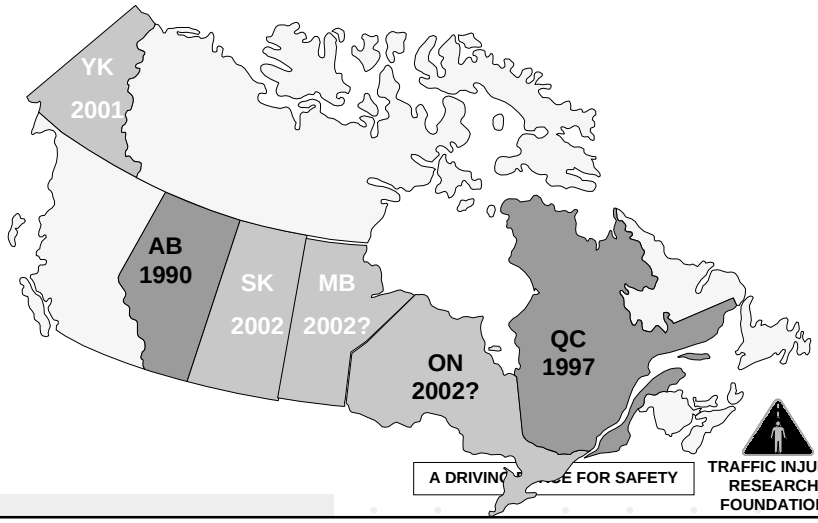
Interlock Programs in Canada



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Interlock Programs in Canada

- Administrative programs
- Primarily voluntary
- Mostly first offenders
- Participation 10-25% of offenders

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Interlock Programs in the U.S.

- 42 states have interlock legislation
- Mix of administrative and judicial programs
- Participation rates are generally low

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A Bit of History

- A car that drunks could not drive
- Universal application
- Proved a difficult challenge

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Today…

- 15 years experience with interlock programs for DWI offenders
- Technology advanced
- Reduce recidivism
- Could be even more effective

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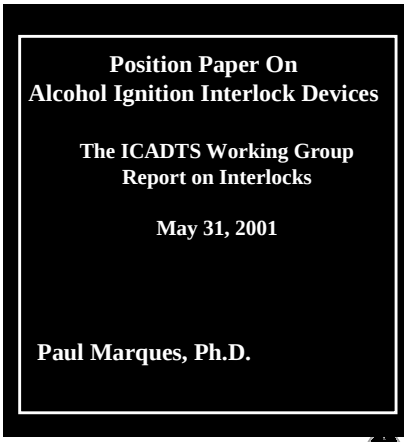
Best Practices Report

- ✓Perspective
- ✓Legislation
- ✓Eligibility/Targets
- ✓Service provider
- ✓Monitoring
- ✓Program duration
- ✓Program integration

Best practices for alcohol interlock programs

ICADTS report

- Special working group on interlocks
- Advice and knowledge from international experts



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Perspective

- More than a breath tester in a vehicle
- Programs not devices
- Not simply a means of short-term incapacitation
- Integrated set of activities that includes monitoring, counselling & rehabilitation
- Bridge between full suspension and full reinstatement

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Target Groups

- DWI offenders
  - First offenders
  - Repeat offenders
- Commercial operators
- Young drivers
- All drivers

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Targets & Objectives

DWI offenders

- **Punishment**
- **Short-term incapacitation**
- **"Buffer" period during rehabilitation**
- **Allow mobility while at the same time ensuring public safety**

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The Alberta Interlock Program

- **Administrative program**
- **User pay**
- **Minimum 6 months**
- **Program monitored and can be extended**

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Eligibility: Voluntary

- Incentive is early reinstatement
- Serve mandatory minimum 3-month suspension
- Clean record during suspension
- Complete all reinstatement conditions
- Minimum 6 months or duration of suspension

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Eligibility: Non-voluntary

- Can be ordered to install interlock as condition of reinstatement
- Most are repeat offenders
- Minimum 6 months, most longer
- Program is reviewed and can be extended
- Restrictive, punitive focus

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The Alberta Interlock Program

- Most are 1st offenders
- Only 10% of offenders participate
- Demonstrated effective in reducing recidivism

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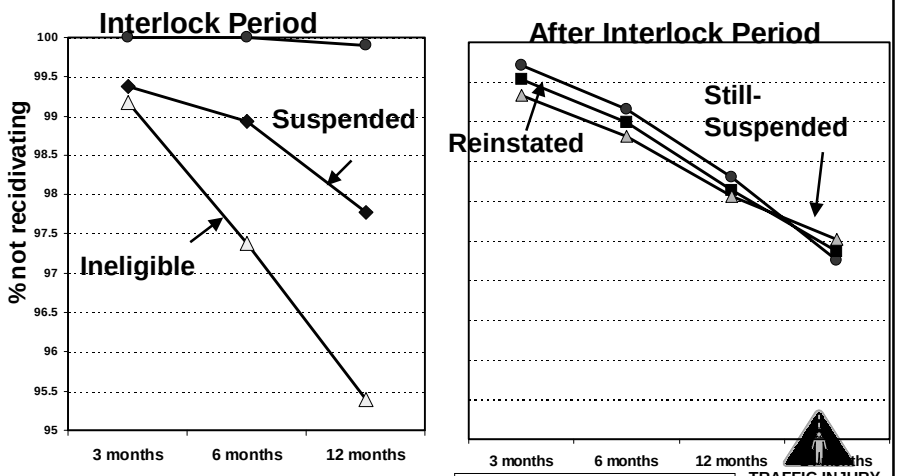
First-Offenders Survival Rate



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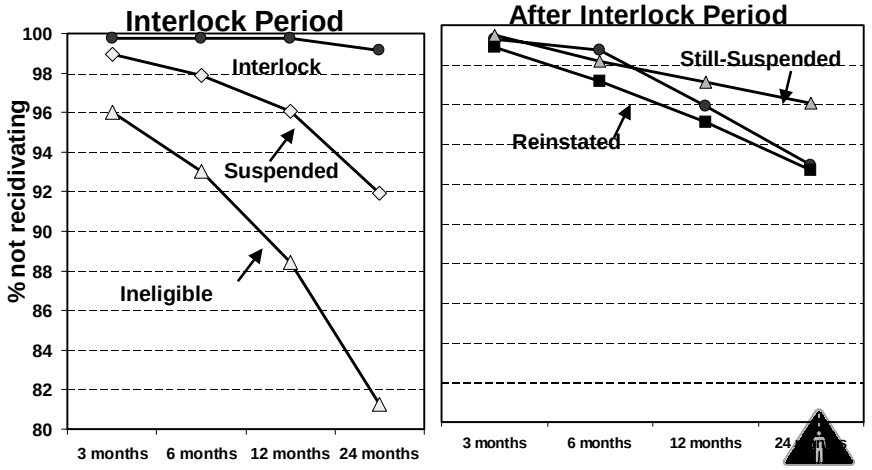
Repeat Offenders Survival Rate



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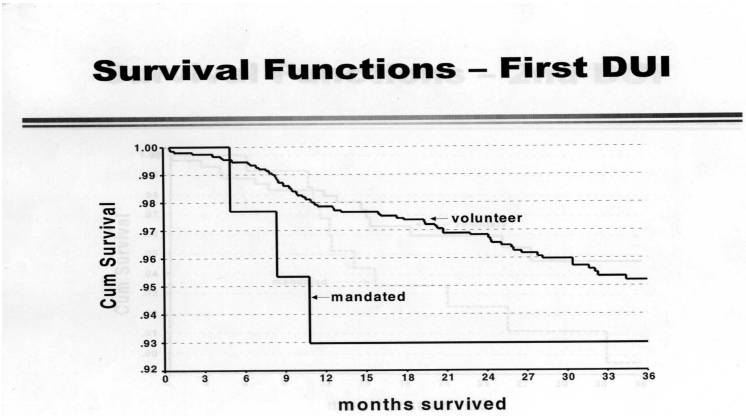
Voluntary vs Mandatory



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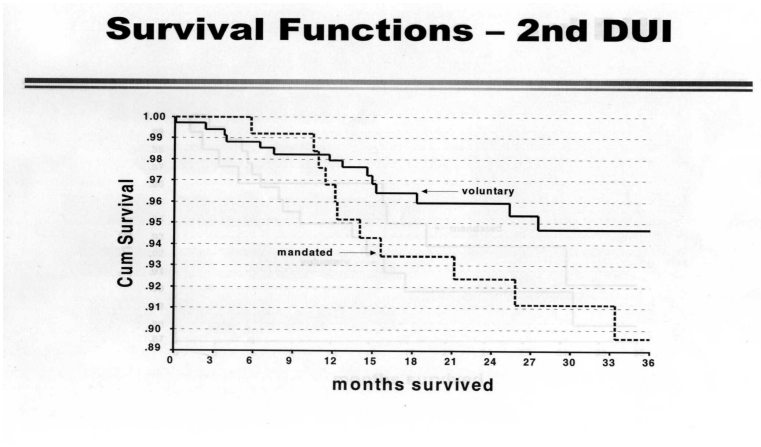
Voluntary vs Mandatory



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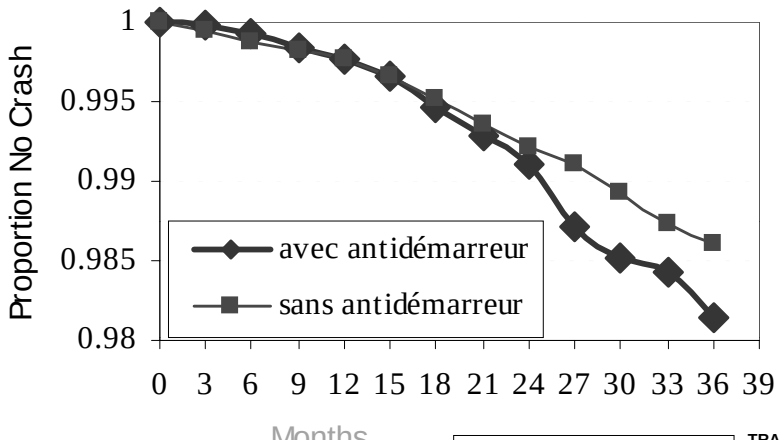
SVN Crashes: Quebec



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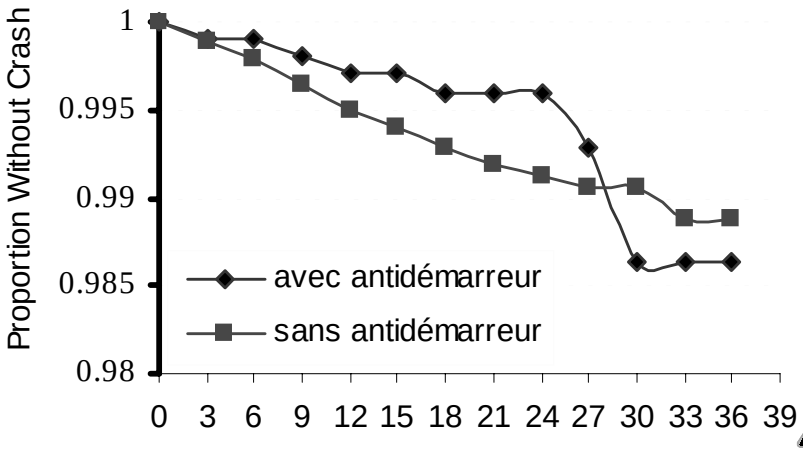
SVN Crashes: Quebec



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Conclusions

- **Interlocks prevent repeat offences at least while installed**
- **After removal, reoffences increase**
- **While installed, interlocks provide a period of low risk during which society is protected**
- **Provides opportunity for intervention**

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Target Groups

- **Positive results for all DWI offenders**
- **Best results with lowest risk groups**
- **First offenders better than repeat offenders**
- **Voluntary better than mandatory**
- **Target depends on objectives**

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Objectives define Targets

- **Punishment**
  - Repeat offenders
- **Short-term incapacitation**
  - First-time offenders
- **Mobility**
  - First-time offenders
- **Public safety**
  - All offenders, including “ineligibles”
- **Rehabilitation**
  - Tailored program for all offenders

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Best Practices: Targets

- **First offenders are easy**
  - High success rate
  - Most likely to volunteer
- **Repeat offenders more difficult**
  - Success rate good
  - Less likely to volunteer
  - Is long interlock period more effective than long suspension?

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Best Practices: Targets

- **Voluntary programs**
  - High success rate
  - Highly motivated offenders
  - Requires incentive
- **Mandatory programs**
  - Success rate good
  - Perceived as punitive
  - Requires clear purpose and objective

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High Priority Targets

- DWI offenders at greatest risk of recidivism
- "Ineligible" group
- Repeat offenders

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Is "Hard" Suspension Necessary?

- Long tradition of suspensions in North America
- Suspension works
- Disbenefits to long suspensions
- Allow reduction in length of suspension

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Perspective

- More than a breath tester in a vehicle
- Not simply a means of short-term incapacitation
- Integrated set of activities that includes monitoring, counselling & rehabilitation
- Bridge between full suspension and full reinstatement
- Includes ALL offenders

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A Final Word...

- Program
- Inclusive
- Incentives
- Early entry
- Link exit to performance

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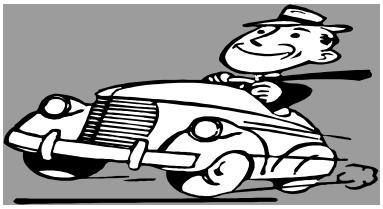
Law 1 Feb. 1999
re conditional license revocation

Condition: AIID plus medical follow-up

Trial period 5 years

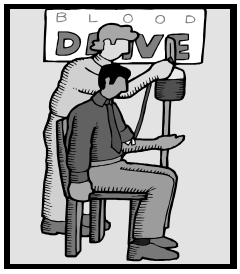
Three counties

Who may participate?



- **Anyone whose license *is to be* revoked for DUI**
- **The participant may not be dependent on or be an abuser of other drugs**
- **No limitations as to BAC upon arrest**

Medical requirements:



- First check to verify no drug dependency
- Check every 3 months incl bio markers
- Last 12 months – normal levels and no positive AIID tests

The penal system is not involved

Participants are penalized with fines or inprisonment as usual

The participants pay all costs

Duration: 2 years for each participant

The costs can be compensated -

- Remaining in employment - loss of license often means unemployment
- The AIID forces the participant to reduced alcohol consumption = less expenses
- No cost for new driver license testing

How much does it cost?

• Application	50	Euros
• First medical	160	
• Administrative court	125	
• Installation and removal	125	
• Leasing of AIID	3000	
• Medical check-ups	1500	
• New drivers license	35	
• Total cost app.	5000	Euros

ANNEX 12. Minimum standards for an EU field trial on alcohol interlocks

Equipment:
- a fourth-generation BAIID based on electrochemical sensing technology (fuel cell),
- for Northern countries: BAC accuracy requirements over an extended temperature range (-45 to +85),
- the BAIID should contain a data recorder,
- the BAIID should contain sufficient anti-circumvention features,
- the BAIID should contain an emergency by-pass element.

Application procedures:
- a BAC threshold of 0.2 g/l,
- participants should take a drug test, drug dependent persons should be excluded from the BAIID programme,
- accompanying rehabilitation measures should be taken (educational and/or psychological),
- the BAIID programme should basically be user-paid,
- individual developments in the programme should be monitored,
- administration of the programme should be done by executive authorities in charge of traffic safety issues.

Design for a field trial
- target groups can be professional drivers or DUI offenders who have had a period of (mandatory) BAIID use imposed by the courts as an alternative of hard licence suspension,
- a standard hard suspension period preceding the BAIID programme should be restricted to very serious DUI cases,
- for professional drivers, the BAIID should stay in their car during the whole experimental period. For DUI offenders, the period of installation could be linked to the period of probationary licence suspension,
- the aim of the programme for professional drivers should be to evaluate the effect of BAIID use on the BAC distribution of the drivers involved. The aim of the programme for DUI offenders should be to evaluate the effect of BAIID programmes on recidivism and, if possible, on accident rates and to determine the cost-effectiveness of the programme (also if possible),
- for professional drivers, the most suitable experimental design is a pre- and post-test with control group,
- for DUI offenders, the most suitable design is a post-test-only design with equivalent groups,
- for the DUI offenders, the experimental group could consist of DUI convicts who have had a BAIID programme imposed or offered by the courts or who follow a rehabilitation course. The control group should consist of DUI convicts who have had a hard suspension period imposed,
- the experimental group of professional drivers should contain at least 100 vehicles. The experimental group of DUI offenders should contain approx. 500 actual participants. The control group should contain about 1,000 participants.