

Summary:

Drink-driving with heavy vehicles

Prevalence, accident risk and possible countermeasures

The prevalence of drink-driving among drivers of heavy vehicles is low in Norway. An estimated 0.005 – 0.25 per cent of all driving of heavy vehicles in Norway is carried out by drivers having a blood alcohol concentration (BAC) above the legal limit of 0.02 per cent, based upon breath tests of 2836 heavy-vehicle drivers checked by the Mobile Police. One of these drivers had a BAC above 0.02 per cent. Also among heavy vehicle drivers involved in fatal accidents the prevalence of drink-driving is low, between 0.0 and 1.21 per cent, an estimate based on data from 232 fatal accidents involving a total of 247 heavy vehicles from 2005 through 2008, described by the Accident Analysis Groups of the National Public Roads Administration. Data from other sources also indicate that the prevalence of drink-driving among drivers of heavy vehicles is low, but references in media show that the prevalence is above zero.

Clear results based upon several sources

The results in this project are based upon existing Norwegian studies, foreign literature, media references, data collected in this project, Norwegian accident data and data from the Accident Analysis Groups. When data from diverse sources, collected by different methods, produce the same results, the validity of the findings is increased.

Drink-driving among drivers of heavy vehicles in Norway

A road-side survey in Norway in 2005-06 showed no alcohol among 208 drivers of heavy vehicles. Participation in the survey was voluntary. Surveys from the US, Canada and Europe have shown low prevalences of alcohol among drivers of heavy vehicles, less than 1 per cent, 0.29 per cent and 0.19 per cent respectively.

A search in Norwegian newspapers from 2002 to 2008 found 25 cases of drink-driving with heavy vehicles and one case of an accident involving a driver of a heavy vehicle under the influence of alcohol.

The Mobile Police Force in cooperation with the TØI has carried out a road-side survey of alcohol among drivers of heavy vehicles from February through April 2009. A total of 2836 drivers of heavy vehicles were stopped and breath-tested, and only one of them had alcohol above the legal limit of 0.02 per cent (0.2 g/L blood alcohol concentration), i.e. 0.035 per cent of the tested drivers. The 95 per cent confidence interval is 0.005 – 0.250 per cent. In addition two drivers had alcohol in their breath, but below the legal limit.

Both existing Norwegian data, studies from abroad and the road-side survey carried out in this project indicate that the prevalence of alcohol among drivers of heavy vehicles is low and lower than among drivers of light vehicles.

Accident risk of drink-driving with heavy vehicles

Drink-driving increases accident risk in general. Norwegian road accident data contain hardly any information about the use of alcohol among the road users involved in accidents, but for the years 1983 – 1999 information about police suspicion of alcohol use was included. This information is likely to reflect the actual alcohol use of the drivers to a certain extent. The data for 1983 – 1999 show that drivers *suspected* of drink-driving had a higher risk of being involved in *fatal* accidents compared to *injury* accident, approximately 30 per cent higher among drivers of all heavy vehicles and 130 – 150 per cent higher among drivers of passenger cars.

All fatal accidents in Norway are studied in depth by the accident analysis groups of the National Public Roads Administration. During the years 2005 – 2008 there were 232 fatal accidents involving a heavy vehicle, and a total of 247 heavy vehicles were involved in these accidents. None of the drivers of the heavy vehicles were found to be under the influence of alcohol, giving a prevalence 95 per cent confidence interval of 0 – 1.21 per cent. One driver was impaired by amphetamine and one by cannabis. In principle all drivers involved in fatal accidents should be tested for alcohol, but in practice some drivers may not be.

In more than 50 per cent of these fatal accidents the heavy vehicle has not been active in causing the accident, whereas in less than 10 per cent of the accident it is obvious that no other road user has caused the accident. A lower share of the fatal accidents involving heavy vehicles is alcohol related than fatal accidents involving passenger cars.

Since the number of alcohol-impaired drivers in the fatal accidents is zero, and the prevalence of alcohol in the roadside survey was 1 of 2836 heavy-vehicle drivers tested, it is impossible to calculate the accident risk of alcohol impairment.

An analysis of 11 studies from outside Norway shows that the share of heavy-vehicle drivers impaired by alcohol is higher when the driver is guilty than when the driver is only involved – both for fatal and injury accidents. The share of alcohol-impaired drivers is higher in fatal accidents than in injury accidents. The share of drivers impaired by alcohol involved in fatal accidents is higher among drivers of trucks without trailers than among trailer drivers.

For bus drivers there are higher percentages of alcohol impairment among those involved in fatal accidents than among those involved in injury accidents. For all kinds of accidents and accident involvement the share of drivers impaired by alcohol is higher among drivers of passenger cars than among drivers of heavy vehicles and busses. This fact shows that alcohol impairment is of less importance for accident involvement for heavy-vehicle drivers than for passenger-car drivers, the reason being that alcohol impairment is less frequent among heavy-vehicle drivers than passenger-car drivers or that alcohol is less important for accident risk among heavy-vehicle drivers than among passenger-car drivers.

Possible reduction of drink-driving among heavy-vehicle drivers by alcohol ignition interlocks

An alcohol ignition interlock or alcolock is a breathalyzer connected to the vehicle ignition. The engine can only be started after a breath test which shows no alcohol above a certain limit. Alcohol positive breath-test results are recorded in the interlock. Consequently, it is difficult to hide the result from the vehicle owner, who is often the employer. Alcolocks may have a bypass switch making it possible to start the engine even after an invalid test or a positive test. The point of the bypass switch is primarily to avoid delays caused by technical problems with the alcolock.

To reduce the possibilities of manipulating the alcolock there are several technical ways to disable other people than a driver already registered with the alcolock to make a valid breath test. The alcolock may also ask for repeated breath tests at irregular intervals during the driving to avoid drinking while driving or leaving the car to drink with the engine running. Such setting of the alcolock will not cause immediate stop of the car in case of a positive test, but for safety reasons the car will stop some minutes later.

Trials with alcolocks in commercial vehicles have been carried out in Germany, Norway, Spain and Sweden, giving diverse results as to percentage of alcohol positive tests (lockouts). This percentage was 0.045 in Norway, 0.192 and 0.337 in two Swedish studies, 0.45 in Germany and 0.794 in Spain, i.e. no trial had a percentage above one. The high numbers of positive breath tests in Germany and Spain were explained by the fact that the drivers wanted to test the alcolocks. There is no information as to vehicles being driven by an alcohol-impaired driver. It was not possible to draw conclusions as to the number of trips made by impaired drivers being prevented by the alcolock.

Possible reduction of drink-driving with heavy vehicles by increased enforcement

Enforcement by DUI checkpoints reduces the prevalence of drink-driving in road traffic and in road accidents, whereas enforcement by patrolling does not, but these results do not apply specifically to heavy vehicles. In Norway the following factors may influence the impact of enforcement on heavy vehicles:

- The risk of being detected is low for drivers of heavy vehicles because there may quite often be no space to stop heavy vehicles at the DUI checkpoints.
- The DUI checkpoints for heavy vehicles are predictable, because such checkpoints require enough space, thus being carried out at a few locations only.
- Heavy-vehicle drivers communicating with each other are able to warn each other if they see a DUI checkpoint.

Moreover, the possibility of license apprehension and suspension is likely to be more severe for heavy-vehicle drivers than for passenger-care drivers.

If the enforcement of drinking and driving rules directed towards drivers of heavy vehicles is to be effective, the checkpoints should be located in such a way that the possibility of detours is minimized.

Internal enforcement in companies employing drivers

In 1994 an act was introduced in the US to the effect that companies employing drivers of commercial vehicles should carry out alcohol tests among 10 per cent of their drivers. The legal limit for drivers of heavy vehicles is 0.4 g/l in the US. A study including fatality data from all states from 1988 through 2003 shows that the number of heavy-vehicle drivers impaired by alcohol and involved in fatal accidents has been reduced by 14.5 per cent due to this internal enforcement.

Implementation of alcolocks and drink-driving enforcement for heavy-vehicle drivers

Alcolocks

Apart from voluntary alcohol checks before the drivers start driving, alcolocks are for the time being the only realistic alternative to police enforcement of drink-driving rules. Alcolocks prevent drink-driving, but the possible reduction in drink-driving caused by alcolocks depends on the alcohol prevalence before alcolocks are installed. If the alcohol prevalence among heavy-vehicle drivers is initially low both in road traffic and in accidents, the potential for reduction is also low.

A Norwegian initiative for the implementation of alcolocks in heavy vehicles by law or by voluntary arrangements will only include vehicles registered in Norway. Whether alcolocks will influence the competition between Norwegian and foreign vehicles, will depend upon the costs of alcolocks and the marketing value of a guarantee of drivers not being impaired by alcohol.

A possible implementation of alcolocks in heavy vehicles by law in Norway may be in conflict with the European Union rules concerning free flow of goods and services, and consequently implementation by incentives may be more realistic. Such incentives may be requirements of alcolocks installed in vehicles in tendering for transport contracts as has already been done in Sweden. The introduction of such requirements in tender contracts is likely to depend on the profitability or the accident reducing potential of alcolocks. Consequently, reliable information on the prevalence of alcohol among drivers involved in accidents becomes important.

If alcolocks come into use to a greater extent, rules regulating this use will be needed, and the authorities could help in developing such rules.

Police enforcement

Stopping heavy vehicles for checks of alcohol or other matters is more difficult because heavy vehicles require more space to slow down and to park. Consequently, it is a challenge for the police to find places to arrange check-points. The practical aspects of arranging heavy-vehicle checkpoints may vary between vehicle types, e.g. busses may have tight schedules and may be full of passengers.

Alternative enforcement

There is serious doubt whether it would be legally acceptable for the police to check heavy-vehicle drivers for alcohol before they start driving. Such enforcement can only be carried out voluntarily according to an agreement between the transport company and the drivers' unions.

The National Public Roads Administration (NPRA) enforces technical vehicle standards. If the NPRA officers suspect that a driver has been drinking, they will inform the police. To increase alcohol checks the NPRA officers could check all heavy-vehicle drivers stopped.

Cost-benefit of alcolocks and increased enforcement

Accident costs

The societal costs of traffic accidents in Norway are on the average about 2.69 million NOK (€0.3 million) per injury accident. This is based on the average number of fatalities and injuries in accidents, and the societal costs of these. The societal costs of accidents involving heavy vehicles are about 4.08 million NOK (€0.45 million) per injury accident, which is due to the larger number of personal injuries in accidents involving heavy vehicles.

Alcolocks

A numerical example shows how many accidents must be prevented by alcolock if alcolock is to be socially cost efficient. The cost of purchasing and installing an alcolock is 17 000 NOK (€1888.9) and annual maintenance including mouth pieces is 1000 NOK (€111.1). The discount rate is 4.5 per cent. The present value of the costs of an alcolock for 10 years is 24913 NOK (€2768). The annual accident costs to be saved by an alcolock are then 3148 NOK (€350) per alcolock, equivalent to 0.0007 injury accidents per heavy vehicle (except busses). The actual annual number of injury accidents per heavy vehicle (except busses) is 0.004. If alcolocks will prevent 16.6 per cent of all injury accidents involving heavy vehicles (except busses), the benefit will equal the costs. For busses the annual accident costs to be saved by alcolocks equal 0.0009 injury accidents per bus. The actual annual number of injury accidents per bus is 0.008. If alcolocks may prevent 12.2 per cent of all injury accidents involving busses, the benefit will equal the costs.

According to Norwegian road accident statistics 0.8 per cent of all heavy-vehicle drivers involved in accidents, are impaired by alcohol. Even if this estimate is old and unreliable, it seems highly unlikely that alcolocks can prevent more than 16.6

per cent of injury accidents involving trucks and trailers or 12.2 per cent of all injury accidents involving busses.

For single companies or individual owners alcolocks may imply benefits and costs not included in the analysis of social costs above, e.g. marketing value. If a bus company has a driver who drives while alcohol-impaired, and this fact becomes public, the company may lose good will among passengers and authorities. It is, however, most difficult to estimate the value of such good will.

Increased enforcement

The present costs of enforcing the legal alcohol limit among heavy-vehicle drivers are not known. Depending on the reduction of accidents by increased enforcement, it is estimated that between 4.5 million and 26.3 million NOK (€0.5 million and €2.9 million) can be spent for increased drink-driving enforcement annually in the whole country in a socially profitable way.

Discussion

Existing data for Norway, research in other countries and the data collected and analyzed in this project indicate that the prevalence of alcohol among heavy-vehicle drivers is extremely low both in general road traffic and in fatal accidents. Nevertheless, newspaper articles found on the internet show that drink-driving among drivers of heavy vehicles, including busses, exists in Norway.

The simple cost-benefit analyses of increased enforcement and the use of alcolocks indicate that the use of alcolocks to reduce drink-driving among drivers of heavy vehicles in Norway would not be profitable, but some more resources spent on drink-driving enforcement could be. However, what is an acceptable degree of a problem and the use of resources to reduce the problem further, can always be discussed.

Possible countermeasures

A number of *improvements in data collection* concerning drink-driving among drivers of heavy vehicles are necessary in order to allow the calculation of reliable risk estimates and the conduction of cost-benefit analyses and evaluation studies of drink-driving countermeasures:

- Complete reporting of BAC among drivers involved in fatal accidents
- Reintroduction of information concerning suspicion of alcohol in the road accident statistics
- More and better road-side surveys concerning alcohol prevalence among heavy-vehicle drivers

Five possible *countermeasures against drink-driving among heavy-vehicle drivers* are likely to reduce drink-driving and to make the enforcement of drink-driving more effective:

- Coordination of enforcement of drink-driving and driving under the influence of other drugs

- More space for DUI checkpoints for heavy vehicles along highways
- Internal enforcement of drink-driving rules in transport companies
- “Alcohol gates” at ferry landings
- Breath testing for alcohol included in the enforcement of technical vehicle standards

Diverse *ways to use alcolocks* are also discussed, such as:

- Incentives for voluntary use of alcolocks , e.g. covering costs for alcolocks in school busses and public transport
- Transport authorities can start preparing rules to regulate the use of alcolocks
- Requirements for alcolocks in vehicles contracted for the National Public Roads Administration
- Co-operation with the Swedish Road Administration and other Swedish authorities concerning the use of alcolocks.