

**Summary:**

## **Driver fatigue and falling asleep – experience, knowledge and conduct among private drivers and professional drivers**

### **Background and research questions**

Next to alcohol, speeding and inattention, driver fatigue or falling asleep is recognized to be among the most important causative factors in road crashes. A campaign to increase drivers' knowledge about this issue is to be launched this spring in Norway by the Norwegian Public Road Administration. In order to evaluate drivers' knowledge on fatigue and falling asleep behind the wheel before the campaign a survey was conducted among both private and professional drivers in the autumn of 2003. Due to the fact that the knowledge often is dependent on previous experience with a certain phenomenon, the question of drivers' experience with sleepiness and falling asleep behind the wheel was also raised in the project. It is also interesting to examine if the probability to fall asleep behind the wheel vary between different kinds of drivers (based on differences in individual/transport characteristics, differences in conduct and habits and differences in structural conditions).

For drivers to take the necessary measures (both beforehand and while driving) to prevent oneself from falling asleep while driving, it is important that they have knowledge of what measures that are effective. In addition, it is important for drivers to know what factors that may cause fatigue and sleepiness while driving, so they can take the necessary precautions before (especially before a longer car trip) and during driving. The project distinguishes between factors that are self-inflicted or personal (such as too little sleep and medication) and factors concerning the road and traffic environment (such as monotonous road environment, darkness and heavy traffic).

A precondition for drivers to take any measures at all, is however that they take sleepiness while driving seriously. Drivers' awareness of the risk of falling asleep and of the severity of sleep-related accidents might indicate their understanding of the problem. Another precondition for drivers to act upon their sleepiness while driving, and to a certain degree before starting the car for a longer trip, might as well be that they have knowledge of the legislation in the area. In Norway it is prohibited to drive while not fit, for instance when feeling sleepy or fatigued. Most of the professional drivers are in addition submitted to regulations of hours of service. The purpose of these regulations is both to reduce the risk of severe accidents and to improve working conditions. Most countries have implemented such regulations, although with some variations between countries. The hours of service regulations have three main focuses: Limitations regarding the maximum

hours of driving during a 24-hour period, requirement to take at least one rest break during the workday, and requirement for rest between the work-periods.

This project has examined the following questions regarding drivers' experience, knowledge and conduct in relation to sleepiness and falling asleep behind the wheel (when not noted, the questions comprise both private and professional drivers):

- To what extent have drivers experienced falling asleep while driving? What are the contributing factors to falling asleep behind the wheel?
- What are the drivers' knowledge of measures both before and during a trip which are effective to prevent themselves from falling asleep?
- What are the drivers' understanding of the problem with sleepiness and falling asleep while driving?
- Are the drivers aware of the factors that contribute to sleepiness behind the wheel? Do the drivers know the risk of driving after taking certain medicinal drugs?
- Are the drivers acquainted with the general legislation that regulate driving when feeling tired or fatigued? How well do the professional drivers that are submitted to the regulations of hours of service, know these regulations?
- Do the drivers act according to their knowledge? And if not, what are the reasons for acting differently?

## **Data sources**

Two separate questionnaire surveys were carried out among private drivers and professional drivers in the autumn of 2003, the former was completed on the Internet and the latter was distributed by mail. While the questionnaires were worked out by the Institute of Transport Economics in cooperation with the Norwegian Public Road Administration, the data was collected by Tns Gallup, the largest market research company in Norway, also specialized in collecting data.

2783 private drivers were randomly selected from the so called "Gallup-panel", which is a sample base consisting of pre-recruited persons having volunteered for future internet surveys at Tns Gallup. The respondents of the sample base are recruited randomly by telephone. In building up this sample base, Tns Gallup has corrected for the fact that the population of Internet users are younger than the general population as a whole. The sample base consists however only of respondents between 18 and 61 years. Thus, the survey is to be recognised as representative for the population with a driver licence between 18 and 61 years. 1513 private drivers completed the questionnaire, yielding a response rate of 54 %.

The professional drivers were recruited from the memberregister of the Norwegian Transport Workers' Union. A total of 2854 members were selected, 72 % were bus drivers and 28 % were truck drivers. 1169 drivers completed the questionnaire (yielding a response rate of 41 %). The share of bus drivers and truck drivers among the respondents were more or less equivalent with that of the

grand sample. 94,2 % of the respondents were men, a proportion that most likely reflects the actual population of professional drivers.

## **Falling asleep behind the wheel - experience**

The study indicates that sleepiness and falling asleep is a widespread phenomenon. Among the private drivers, 44,8 percent have experienced falling asleep while driving (one or several times) one time or another and 11 percent experienced this (one or several times) during the last year. As previous research also has shown, there are far more men than women who have experienced falling asleep. This is largely to be explained by difference in driving distance. It is a well known fact that men in general drive more (and longer) than women.

When it comes to predictors of falling asleep, age has a small, but significant effect. The probability of falling asleep is significantly higher for the youngest and oldest age categories. 14,5 percent of the drivers between 18 and 25 years and 12,5 percent between 56 and 61 years have experienced falling asleep during the last year. Furthermore, the probability of falling asleep increases with higher work load and with work at irregular hours (afternoon/evening/night work).

Somewhat surprising is the result that indicates that professional drivers to a lesser degree have experienced falling asleep some time (36 percent) behind the wheel than private drivers (44,8 percent). Considering the total length of driving (professional drivers tend to drive more than private drivers), one should expect the opposite. Even when corrected for type of transport (the probability of falling asleep is higher for truck drivers than for bus drivers) the share of professional drivers who have fallen asleep when driving does not exceed that of the private drivers. One explanation of this is that there might have been a certain degree of self-selection in the survey among private drivers, which, in turn, may have caused a larger share that have experienced falling asleep among private drivers in the sample than in the population as a whole. Thus, comparing the shares that have experienced fallen asleep during the last year, may give a more accurate picture of the differences between private drivers and professional drivers when it comes to falling asleep when driving. These results indicate that the probability to fall asleep is somewhat higher among both the professional drivers in general (13,2 %) and among truck drivers alone (15,9 %) than among private drivers (11 %), though it is only the difference between truck drivers and private that is significant.

The probability to fall asleep among professional drivers decreases with higher age and with more work experience (when considering the experience with falling asleep while driving during last year), a result that indicates that driving experience and, most likely, experience with sleepiness or/and falling asleep while driving improves the professional drivers' conduct (i.e. taking the right measures to prevent sleep) regarding sleepiness and fatigue behind the wheel.

## **Understanding of the risk and the consequences**

When it comes to knowledge of the risk of falling asleep, the drivers were confronted with several statements concerning characteristics of drivers who fall asleep (age, sex, physical condition, sleeping problems) in addition to a statement that falling asleep can happen to anyone. Based on the drivers evaluation of these statements, it seems to be a general agreement among them, both private and professionals, that falling asleep can happen to anyone. In addition, they seem to have good knowledge of the actual risk of falling asleep while driving. The private drivers and the professional drivers respectively assumes that an average of 40 and 36 drivers out of a hundred drivers have experienced falling asleep while driving. Calculated in percent these numbers makes up shares that are close to the actual proportions found in this study. Hence, the knowledge of the actual risk of falling asleep among drivers seems to be quite good.

Even though the drivers seems to acknowledge falling asleep as an important cause in road accidents, few drivers seems aware of the severity of sleep-related accidents. It is a fact that sleep-related accidents are more severe than other accidents. Even though the knowledge about this is somewhat better among the professional than the private drivers (30 percent of the private drivers and 50 percent of the professional drivers agree with this, their knowledge is far from sufficient. Lack of this knowledge may prevent the drivers from taking sleepiness and fatigue while driving seriously, but considering their knowledge of the risk of falling asleep and assuming that drivers are aware that falling asleep might have some sort of consequence independent of severity, one should anyhow expect them to try to avoid falling asleep while driving by some kind of action.

## **Measures – knowledge and conduct**

The most common cause of sleepiness is insufficient sleep, and most of the drivers seems aware of the significance of sleep in general. Not enough sleep over a period of time (3-4 days) and too much wakefulness are the main personal factors that drivers consider to increase the probability to fall asleep while driving. In addition, most drivers agree with the fact that “24 hours without sleep equals a blood alcohol level of 0.1 percent when it comes to driving capabilities”. The drivers consider a good nights sleep before a longer car trip to be somewhat less important than sufficient sleep over a longer period, though research has proven that a good night sleep is of considerable importance in regard to a person condition the next day. This might be one factor in the explanation of why few drivers actually get enough sleep the night before a longer drive. More knowledge about this among drivers seems important.

As for the use of medicines that may influence driving skills (marked with a red warning triangle), this seems to represent only a minor problem as few drivers use such medication. In addition, there is a general agreement among the drivers, both private and professionals, that the use of medicines with a warning increases the risk of falling asleep while driving. It is, however, somewhat disturbing that a small part (25 %) of the few that use such medication, also use it when driving.

In spite of the drivers' general knowledge about the significance of sleep, few drivers act in accordance with this knowledge. Few drivers do actually get sufficient sleep for a longer period of time before a longer drive, and only few drivers stop to take a nap when feeling tired and fatigued while driving. Taking a nap is proven to be the only effective measure when feeling tired to prevent oneself from falling asleep while driving, and is also by the drivers (both private and professionals) considered to be one of the most effective measures. More often the drivers take measures (when feeling tired while driving) that they consider to be less effective, like different measures taken *in* the car (opening up the window, putting on music, singing/talking to themselves etc.) without stopping. The only measure which is taken that corresponds with their knowledge or opinion of what is effective is to stop and get out of the car. Quite a few have reported this kind of conduct when feeling tired while driving. This measure, however, seems to have only a temporary effect on sleepiness.

In spite of all the drivers' knowledge of the risk and of the significance of sleep/taking a nap, most of the drivers continue driving when recognising sleepiness while driving. The professional drivers argue that time schedules and pressure from the management are important factors for ignoring symptoms of fatigue and sleepiness while driving. Social factors have a contributing role for the private drivers as well, who often argue that appointments and the wish to come home at a reasonable hour are the reasons for continuing driving while fatigue or sleepy. Additional arguments among the private drivers are related to the distance of driving – either if it is a short drive or a short distance left to the point of arrival. Such arguments are of less importance among the professionals.

In sum, there seems to be little correspondence between knowledge and action when it comes to measures to prevent sleepiness and falling asleep, both before and during driving. It must be pointed out that, in general, the professionals to a larger degree take action when feeling tired behind the wheel compared to the private drivers – both in regard to measures before the drive (getting enough sleep the night before a longer drive) and in regard to measures during a drive (continue driving or not and/or take a nap or not). That the professionals are subjected to the regulation of hours of service, might be one explanation of this. The fact that professional drivers are more aware of the consequences related to sleep-related accidents than private drivers, might be another.

## **Legislation – knowledge and conduct**

Knowledge of the general legislation that regulate driving while fatigued or tired, are rather modest among both the private drivers and the professional drivers (respectively 50 and 60 percent are aware of the fact that driving while fatigued or tired is prohibited). Furthermore, most of those who do know the legislation states that it happens that they continue to drive even when feeling fatigued or tired. The principal argument for most of them is that they are capable themselves to judge the risk related to their tiredness and fatigue.

Most of the professional drivers who are submitted to the regulations of hours of service, have a good knowledge of these regulations, and most of them agree with the statement that breaking these regulations increases the risk of falling asleep while driving. In spite of this, many of the professional drivers break the regulations themselves. 2 percent of them state that they break the regulations “often/on a regular basis” and 55, 3 percent state that they break them “some time or another”. This is disturbing considering the clear monotonous relationship between breaking this regulations and experience of falling asleep, which is also shown in this study.

## **Conclusion**

In spite of the drivers’ knowledge of the risk of falling asleep and of the effective countermeasures, most of them continue driving when recognising sleepiness while behind the wheel. This might indicate that driver fatigue and sleepiness is not taken seriously enough and that the drivers overestimate their own capabilities, but it might also be a matter of lack of knowledge on *when* to act on their sleepiness behind the wheel. But different social factors also have an effect on how drivers act upon their sleepiness – which in turn might represent another explanation of why drivers do not act in accordance with their knowledge.