

### **Etude suédoise: impact d'un pare-brise usagé sur la sécurité au volant**

Une étude menée par le VTI, l'Institut national suédois de recherche sur les infrastructures routières et les transports, a montré qu'un pare-brise usagé augmente le risque pour le conducteur d'être aveuglé par le soleil ou par les phares des véhicules circulant en sens inverse.

En effet, les particules dans l'air et les essuie-glaces soumettent le pare-brise à d'importants dommages. Ainsi, la lumière est incorrectement réfléchiée et la visibilité dégradée, par exemple lorsque le soleil est bas dans le ciel ou lors d'un croisement avec une voiture venant en sens inverse, la nuit.

Trois pare-brise ont été utilisés: un neuf, un ayant déjà été utilisé pendant 150.000 km et un ayant déjà été utilisé pendant 350.000 km. 24 participants ont conduit sur simulateur, une fois avec chaque pare-brise. Les rayons d'un soleil bas dans le ciel ont été simulés par une lampe, de sorte à créer un éblouissement.

Les résultats ont montré que la distance de visibilité était réduite de 130m avec un pare-brise usagé par rapport à un pare-brise neuf.

Des obstacles ont également été placés sur le circuit. Lorsqu'ils conduisaient avec un pare-brise usagé, les conducteurs les détectaient plus tardivement, freinaient plus difficilement et leur manœuvre était plus brutale, bien qu'ils aient réduit leur vitesse d'environ 15 km / heure. Certains conducteurs n'ont pas du tout réussi à éviter les obstacles. Aucun des passages d'obstacles, lors de la conduite avec le pare-brise neuf, n'a entraîné de collision, tandis que 4% des passages avec le second pare-brise et 8% des passages avec le pare-brise le plus usagé, ont entraîné une collision.

Dans des conditions de circulation réelles, d'autres facteurs peuvent réduire la visibilité, telles que la saleté ou la pluie sur le pare-brise. Il y a donc une possibilité que les effets sur le comportement au volant soient encore plus conséquents que ceux mesurés dans cette étude.

*Article résumé de l'anglais par Saint-Gobain Autover France.*

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## Worn Windscreens – a Road Safety Problem

Visibility is one of the most important factors for driving safely. A worn windscreen increases the risk of the driver being blinded by the sun or the lights of oncoming traffic in the dark. This road safety problem has been noted in various studies, and VTI has now studied the effect of driving with worn windscreens on driver behaviour.



A worn windscreen increases the risk of glare, which may have the result that the driver does not see objects or persons on or near the road in time. This may, in turn, mean that there is less chance of preventing an accident.

### Simulator study

In a simulator study, VTI has examined the behaviour of drivers when they were affected by glare from windscreens with different degrees of wear. Three windscreens were used in the study – a new one, one with a mileage of 150,000 km and one with a mileage of 350,000 km.

A study was made in which glare caused by simulated sunlight affects both the driving behaviour and sight distance of the driver. The variables which have an effect on driving safety are first registered. The primary objective of measuring the sight distance is to make it possible to make comparisons with previous studies. A total of 24 test subjects drove the same loop three times, once with each windscreen. The drivers had to pass two obstacles on each run. Glare was created in the simulator by mounting a lamp in front of the windscreen of the simulator. The lamp simulated the sun when low down in the sky.

The test persons said that they regarded both the simulated environment and the driving tasks in the simulator as relatively realistic.

### Worn windscreens increase the risk of accidents

Particles in the air subject windscreens to great stresses and give rise to a sand blasting effect on the glass. Windscreens are also exposed to considerable mechanical damage, mainly from the windscreen wipers. The result of this is that light is refracted incorrectly and sight deteriorates, for example when the sun is low in the sky or when meeting oncoming traffic in the dark.

The effect of glare varies depending on how worn the windscreen is. In the test the sight distance was measured. The results showed that the sight distance was reduced when the worn windscreens were used. The difference in detection distance between the best and worst windscreen was ca 130 m. This is a reduction, on average, by ca 65 per cent.

– When we investigated what happened when the drivers had to take evasive action to avoid obstacles on the road, we saw that they managed this less well when they were driving with a windscreen that was worn, says Anne Bolling who worked in the study. Drivers detected the obstacle later, braked harder and their manoeuvre was more sudden, in spite of the fact that they had lowered their average speed by ca 15 km/hour.

These results indicate a driving behaviour that is more risky or, in other words, has lower road safety.

Some drivers did not manage at all to avoid the obstacle but drove over it. None of the passages with obstacles, when driving with the new windscreen, resulted in a collision, while four per cent of the passages with the second most worn windscreen, and eight per cent of the passages with the most worn windscreen, resulted in a collision. When one considers that in real traffic this may have caused a road accident, the results indicate that there is a large accident risk in driving with a worn windscreen in difficult conditions such as oncoming lights.

Even though this is a study in a simulator environment, with its limitations, it can be stated that driving behaviour is adversely affected when the driver faces the lights of oncoming traffic with a worn windscreen. In real traffic there are several other factors that may influence sight and glare, such as dirt and rain on the windscreen. There is therefore a risk that, in real traffic, the effect on driving behaviour may be much greater than what could be measured in this study.

/Magdalena Green

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