

RISK OF HUMAN LIFE BY USING MOBILE PHONE WHILE DRIVING AND AN INNOVATIVE APPROACH TO THWART MOBILE PHONE ACCIDENTS

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Abstract

Mobile phones are small, compact, easy to use and have become an essential part of life for many people. It enables people to maintain contact with family, friends and business associates. As well as the general communication benefits, access to a mobile phone also provides safety benefits by enabling people to alert breakdown or emergency services when necessary. Talking on the phone and sending text messages while driving are obvious distractions that can lead to fatal accidents on the road. Our research examines the effects of using a mobile phone while driving and proposed an innovative approach to reduce the risk of human life from mobile phone accidents.

Keywords: Risk of Mobile Phone, Preventing mobile phone accident

I. INTRODUCTION

Mobile phones can be an essential means of communication away from the office or home and for motorists they can be an important security asset in the event of an emergency. However, there is considerable concern that using a mobile phone while driving creates a significant accident risk, to the user and to other people on the road, because it distracts the driver, impairs their control of the vehicle and reduces their awareness of what is happening on the road around them.

II. PHYSICAL DISTRACTION

When using a hand-held mobile phone, drivers must remove one hand from the steering wheel to hold and operate the phone. They must also take their eyes off the road, at least momentarily, to pick up and put down the phone and to dial numbers. While using a hand-held phone, the driver must continue to simultaneously operate the vehicle (steer, change gear, use indicators, etc) with only one hand. Although the physical distraction is far greater with hand-held phones, there is still some physical activity with hands-free systems. Even though they do not need to be held during the call, the driver must still divert their eyes from the road to locate the phone and (usually) press at least one button.

III. COGNITIVE DISTRACTION

When mental (cognitive) tasks are performed concurrently, the performance of both tasks is often worse than if they were performed separately, because attention has to be divided, or switched, between the tasks and the tasks must compete for the same cognitive processes. When a driver is using a hand-held or hands-free mobile phone while driving, she or he must devote part of their attention to operating the phone and maintaining the telephone conversation and part to operating the vehicle

and responding to the constantly changing road and traffic conditions. The demands of the phone conversation must compete with the demands of driving the vehicle safely.

Our research examines the effects that using a mobile phone while driving has on driving performance and on accident risk. It comprises:

- ✓ a review of published research about the effects of using a mobile phone while driving.
- ✓ a survey of laws restricting or prohibiting the use of mobile phones while driving.

IV. DRIVERS USE OF MOBILE PHONE

In recent observational surveys at road junctions, 27,900 drivers were observed, 2% (558 drivers) of whom were using a mobile phone. The vast majority (85%) were using hand-held phones.

A survey of 1,000 drivers and motorcyclists found that 37% used a mobile phone while driving, one third of whom did so 'often'. However, 88% said that using a hand-held mobile phone while driving should be illegal and 45% said that using any phone, hand-held or hands-free, should be illegal.

High mileage drivers were much more likely to use a mobile phone while driving: More than 78% of high mileage drivers said they used a phone while driving, compared with 37% of all drivers. They are also much more likely to use a mobile phone 'often' while driving: 45% compared with 12% of all drivers.

Young drivers were slightly more likely (45%) to use mobile phones while driving than all drivers (37%). Female drivers (30%) were less likely to use a mobile phone while driving than male drivers (44%).

An annual motoring survey found similar results in that 39% of drivers admitted to making phone calls from their cars. Over three-quarters of company car drivers used a mobile phone while driving and over half (55%) of young drivers (under 24 years) also used a mobile while driving. Most drivers who use a mobile phone use a hand-held phone, even though 75% of them acknowledged that this is very often extremely dangerous.

Surveys in the USA found that over one quarter (27%) of drivers used a mobile phone while driving on 'most' or 'about half' of their trips, and a further 58% used one on 'less than half' or on 'very few' trips. A more recent estimate³ is that 73% of the USA's mobile phone subscribers use their phone while driving.

Study: Mobile Phone while Driving Increase Accident Risk?

Experimental evidence shows that using a mobile phone while driving impairs driving performance in a number of safety critical ways. The next question is does using a mobile phone while driving actually increase accident risk in real-life driving, and if so to what extent? There is much less data and research to answer this question, largely because it is rarely recorded whether or not drivers were using a mobile phone at the time of an accident. However, some studies have been conducted.

A USA study of 699 drivers who had a mobile phone and who had been involved in a damage-only road accident examined their mobile phone records on the day of the accident and during the preceding week. Statistical analysis indicated that the risk of being involved in a collision was four times higher when using a hand-held or a hands-free phone than when not using one. This finding has been criticized, but in a recent review of their study, the authors have concluded that their findings were robust, and if anything under-estimated the risk.

An analysis of accident data from the USA's Fatal Analysis Reporting System (FARS), National Automotive Sampling System (NASS) and police crash reports from individual States identified that the use of mobile phones by drivers appeared to be a growing factor in crashes (although little data was available). Accident investigations found that the majority of these drivers were talking on their phones, rather than dialing, at the time of the crash. The 'overwhelming majority' of drivers who had a crash while using a mobile phone ran into another vehicle or object that were clearly visible. The report also suggested that accidents caused or contributed to by in-car distraction are likely to increase as more in-car technology is introduced.

Drivers who used a mobile phone while driving were more likely to cause an accident by wandering out of their

lane, more likely to hit a pedestrian and more likely to overturn their vehicle. This report also stated that using a mobile phone while driving increases the risk of a fatal accident three times more than being drunk.

To conclude, despite the lack of data, there is nevertheless evidence from epidemiological studies and from accident reports that drivers who use mobile phones while driving have higher accidents rates than those who do not. As the use of mobile phones is growing so rapidly, it is very likely that they will become an increasingly common cause of road crashes.

Legislative Approaches to Preventing Drivers Using Mobile Phones

V. INDIAN LEGISLATION

As per para 33.3. "The Committee notes that the Motor Vehicles Act, 1988, does not contain any provision or penalty related to the usage of mobile phones by the drivers while driving. However, through an executive order the Government prescribes the penalties for the use of mobile phones while driving. However, the executive order is silent on the following issues:-

- ✓ Should the case be booked under section 184 of the MVA?
- ✓ What does it mean 'while driving' – can one be booked while waiting on a signal?
- ✓ Can hands free-phones be used?

At present, the offence of usage of mobiles will be punishable under the category of dangerous driving vide Section 184 Motor Vehicles Act. The committee feels that the Motor Vehicles Act being a two decade old legislation could not have envisaged the usage of mobile phones and the gravity of the situation which causes large number of accidents. The Committee, therefore, recommends that a new Section should be entrusted specifically for the usage of mobile phones while driving."

As per Para 34.3. "It was submitted to the Committee by the representative of the Institute of Road Traffic Education that the breath alcohol tests conducted on drunken drivers proved that they were having alcohol level of 30 mg to 200mg and above in 100ml of blood. The more the quantity of alcohol makes the driver more vulnerable to accidents. The danger increases manifold when he drives at 90 km/hr or 120 km/hr compared to the low speed driving. The probability of accidents increase with the increase of the speed of motor vehicle. Higher the speed would mean higher the risk of accidents and therefore should attract higher penalty.

As per revised legislation any use of hand-held mobile phone while driving is strictly prohibited. But still the hands-free mobile phones usage is permitted. Exception only in Delhi where there is use of any mobile phones when driving, whether hand-held or hands-free, has been prohibited effective from 1st July 2001. But still there is no effectiveness. The only country contacted which was able to provide statistical evidence on the effectiveness of their Mobile Phone Use While Driving Legislation was Japan.

These figures below shows a significant change in the number of accidents and casualties in collisions involving mobile phone use after the introduction of the legislation prohibiting the use of hand-held phones while driving. Even though Indian legislation system is more or like same as Japanese legislation the only difference is most of the people in India not strict to the rules which leads to this fatal accidents.

VI. EFFECTIVENESS OF JAPANESE LEGISLATION

Table 1. Effectiveness of Japanese Legislation

	12 Months before enforcement	12 Months after enforcement	% change
Number of traffic accidents with drivers mobile use	2,830	1,351	-52.3%
Injured persons from traffic accidents with drivers mobile phone use.	4,118	1,195	-53.3%
Fatalities from traffic accidents with drivers mobile phone use.	25	20	-20%

Automatic Switching of Mobile Phone Profile Based on Current Speed of the Vehicle

By keeping in mind all the studies obtained from above, we suggested an approach to prevent the accident which may occur during driving by changing the profile of the mobile phone accordingly.

A method of automatically switching a profile of a mobile phone comprising a) Measuring the current speed of the vehicle in mobile phone b) compare the current speed with predefined threshold speed c) switching of profile of the mobile based on the comparison result obtained from step b.

The current speed of the vehicle can be obtained either by using GPS speedometer which nowadays comes as inbuilt application in modern mobile phones or by using Bluetooth device attached to the speedometer which transmit the data to the mobile phone.

If the speed obtained from GPS Speedometer exceeds the predefined threshold speed, then the profile will automatically switch to 'silent mode' from any other mode (Loud, Normal, Vibrate etc..) as shown in Fig: 1 and in the mean time if the user get any call's the caller will get a message stating "User is on Driving...So please call back after XX minutes and if its emergency, call 2 more time continuously". The value of XX can be set by the user in the initial stage itself.

In emergencies if the caller is calling from the same number and if the call count equals to three times then automatically mobile phone switches a profile back to 'Normal or Loud' from 'silent mode'. Once the user drops the call the speed will be compared and the process continues.

Consider a situation that the user is driving, he may stop the vehicle in road signals. In this case if the speed is compared surely it will be less than the predefined threshold speed during these time period there is a possibility that the user might get any call which will distract the user attention and it may lead to accident. In order to verify whether the user came to idle or the vehicle halts in road signal, we uses a timer (T) which starts' automatically when the speed of the vehicle reaches below the threshold speed. Between these time periods the mobile phone should not change its profile it has to wait for 60 sec to ensure whether the user came to rest or the vehicle stops in road signal. In short, if the time difference between user halt the vehicle in road signal (t1) and started the driving again(t2) is less than or equal to 60 sec then the mobile will stay back in 'Silent mode' as shown in Fig 2. Else it comes to conclusion that user came to rest and it will change the profile back to 'Loud or Normal mode' as shown in Fig 3.

Note: We have taken the timer value as 60 seconds because in India majority of the road signal will have a timer of 60 seconds.

AUTOMATIC MOBILE PHONE PROFILE SWITCHER APPLICATION	
CURRENT SPEED	THRESHOLD SPEED
45	10
TIMER :00 PROFILE CHANGES TO SILENT	

Fig. 1.

AUTOMATIC MOBILE PHONE PROFILE SWITCHER APPLICATION	
CURRENT SPEED	THRESHOLD SPEED
00	10
TIMER :25 PROFILE REMAINS IN SILENT FOR 60 sec	

Fig. 2.

AUTOMATIC MOBILE PHONE PROFILE SWITCHER APPLICATION	
CURRENT SPEED	THRESHOLD SPEED
00	10
TIMER :25 PROFILE REMAINS IN SILENT FOR 60 sec	

3.

VII. CONCLUSION

The growth in the use of mobile phones has been phenomenal, and extremely rapid. Mobile phones provide a wide range of important social and work benefits, and, in some circumstances, are an important safety feature, allowing users to summon help or report accidents. However, using a mobile phone while driving will create a highly accident risk. Hence usage of mobile during driving have to be avoided but still there may situation arise were the user has to communicate by that time implementation of the above invention helps in preventing the user from talking in mobile phone while driving which in turns helps in reducing the accidents, as well as obeying the government rules on safety driving and in the same time it also facilitate the user for attending the emergency call's during driving only when the user stop driving.

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