



SLEEP DEPRIVED AND NEGLIGENT DRIVING: CAUSES, EFFECTS, STATISTICAL INSIGHTS AND SOLUTIONS

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Abstract : This research offers a thorough investigation of drowsy driving-related traffic accidents. Drowsiness is a major contributing factor in numerous traffic accidents around the world, which can have serious repercussions like injuries, fatalities, and monetary losses. The report examines the causes and effects of drowsy driving-related accidents, analyse preventive measures, and suggests methods to reduce the risks involved. This study attempts to shed light on the problem of drowsy driving accidents by giving a thorough analysis of the causes, consequences, preventive methods, and risk-reduction techniques. Individuals can collaborate to create effective remedies and advance road safety by studying the variables behind drowsy driving incidents. To ensure accuracy and dependability, data from credible institutions such traffic safety agencies, health departments, and road accident databases have been referred.

IndexTerms - drowsiness, driver drowsiness detection.

I. INTRODUCTION

In this world, transportation has become very essential to run this very world in almost every way. Transportation has certainly become a very essential part of our lives. From fast food online ordering to logistics, from small rides to world tours transport is the very basic thing that involves.

After the elimination of the need of transportation for communication, rather than the decrease of the need for transportation, it has certainly expanded enormously. Many factors majorly contribute to the need and expansion of transportation. Establishment of small businesses to large scale companies and enterprises has affected the growth of transportation. Privatization of many government-led subjects had also played a major role in the expansion of transportation. Transportation, which has expanded like a unicorn company of a successful businessman, has itself become a business for many.

Now, certainly, business for one, means livelihood for many, which means profit at both ends. Now, at the time of expansion of one's enterprise, the individual only focuses on the development of his enterprise in the most profitable way possible. In this process, the organization, or the specific individual neglects the comfort, safety and security of a resource that drives this whole enterprise, which is nothing but human resource.

Every country in this world tries to focus on the development of human resource, by appointing a minister and his own committee to handle the human resource, which is not sufficient for this major issue. Private companies, in their race for a better future of their enterprise and their profit and the employees, in their very own race towards a perfect livelihood neglect the safety and security of human resource. The safety and security of human resource certainly comes under the heading of development of human resource which is indeed an important issue to be discussed and solved. Transportation means roadways if we think largely. Roadways are an important building block for a nation since it increases the nation's wealth by allowing smooth transportation of goods, services, important commodities, products, and most importantly human resource.

Safety of human-resources on the roadways can be done by bringing down the number of accidents that are caused due to traffic, timings of enterprises, comfort of customers and many other factors responsible. For the very reason of fast transport and to avoid time complexity, we neglect the safety of ours on the roadways this leads to accidents, which are majorly fatal. To avoid those, everyone needs to be involved. an individual should be taught lessons on road safety for avoiding such cases.

Roadways should certainly provide better transport and driver comfort, for which a whole government needs to be involved enterprises can also enter a pact with governments to increase the safety of our population, especially drivers who work for their livelihood by managing their shifts. But these solutions need numerous decisions to be taken, investment of one's time and interest and many other factors which affect those. But if we only focus on driver safety by adding some machine which could indeed help the drivers with some engineering applications, certainly this would resolve this big issue very easily with minimal investment.

Now the drivers, which are hired by the enterprise are nearly well-known and trained about driving are having no issues about driving. The health factor of the driver is the major issue that needs special attention. Sleep deprivation of the drivers due to night shifts and irregular timings lead to degradation of their health.

Sleeping very less can affect the sleep cycle, hence causes constipation and most of the times sleeps at uneven and unexpected times and drowsiness.



II. Causes of drowsy driving

1. Truck drivers delivering goods by driving overnight without proper rest also fall into this category.

Truck drivers who deliver goods frequently face the danger of being sleepy, especially if they drive overnight without getting enough rest. Fatigue can affect a person's reflexes, judgment, and attentiveness, which increases the risk of accidents. Truck drivers who don't get enough sleep are seriously endangering both their own and other drivers' safety. To minimize sleepy driving and guarantee everyone uses the roads safely, it is critical for transportation businesses to put driver well-being first, set rigorous guidelines for rest intervals and working hours, and raise awareness of the value of good sleeping habits. Truck drivers who deliver goods frequently face the danger of being sleepy, especially if they drive overnight without getting enough rest. Fatigue can affect a person's reflexes, judgment, and attentiveness, which increases the risk of accidents. Truck drivers who don't get enough sleep are seriously endangering both their own and other drivers' safety. To minimize sleepy driving and guarantee everyone uses the roads safely, it is critical for transportation businesses to put driver well-being first, set rigorous guidelines for rest intervals and working hours, and raise awareness of the value of good sleeping habits.

2. Taxi drivers working for long hours daily tend to fall asleep while driving.

Long working hours for taxi drivers can lead to a significant risk of falling asleep while driving. Due to the difficult nature of their work and long shifts, they may get exhausted and less aware of their surroundings. Lack of sleep impairs decision-making and reaction times, putting not just the driver but also passengers and other road users in danger. These drivers usually work extra shifts to make some extra money to support their family. It is essential for taxi businesses and drivers to prioritize enough rest breaks, set up reasonable work schedules, and raise awareness about how important it is to fight driver weariness by getting enough sleep and taking care of yourself to maintain safety.

3. Lack of satisfactory rest.

Around 7 to 8 hours of rest every day at night is fundamental for the human body. Fatigue-related mishap is much higher in case you have been awake for more than 18 hours.

People tend to drive for longer hours to complete their journey in one go, also to save some time. But they forget that they are neglecting the adverse effects that are caused on their body. Driving requires coordination between the mind and body and this coordination becomes essential when it comes to high-speed driving. There have been multiple cases wherein people tend to doze off at higher speeds (>60 kmph) while driving early in the morning or late at night.

4. Driving on long straight patches of highway tend to induce "highway hypnosis" and body fatigue.

Highway hypnosis, commonly referred to as "white line fever," is a term for a trance-like state or a type of dissociation that can happen while driving on long, repetitive lengths of highways or roads. It is distinguished by a lack of awareness and diminished focus on the task of driving. Some people face arm stiffness and back aches due to some medical conditions or due to extensive long hour drives, which render them tired and unfit for driving their response time drops drastically and as their movements become stiff their promptness and alertness is heavily compromised.

5. Sleep deprivation equals consuming alcohol.

Sleep deprivation can have similar effects on your body as consuming alcohol. It is estimated that being awake for 18 hours at a stretch makes you drive like a person who has a blood alcohol content of 50mg per 100 ml, which is unfit for driving purposes.

III. EFFECTS AND STATISTICAL INSIGHTS

1. Increased Accident Risk

The risk of an accident is considerably increased when a driver is driving because of drowsiness. They have significantly high risk of lane wandering or crossing into oncoming vehicle or vehicle behind the driver. Drowsy drivers tend to react slowly to happenings on the road which can turn fatal to both the driver and other people using the road.

2. Risk of Secondary Accidents:

As discussed above, a drowsy driver can be a serious threat to himself as well as the people who share the road. Other drivers on the road can undergo accidents while avoiding the original crash caused by the fatigued driver. These ensuing crashes can lead to a higher number of fatalities than expected which includes innocent people.

Who hasn't done anything wrong but still are having their lives in danger?

3. Legal Consequences

Drowsy driving incidents can have legal ramifications that extend beyond mere violations of traffic laws. In cases where drowsy driving leads to severe accidents or fatalities, individuals may face criminal charges, such as vehicular manslaughter or reckless driving. These charges arise from the catastrophic consequences caused by drowsy driving incidents.

4. Legal and Financial Consequences:

Drowsy driving is widely recognized as a form of impaired driving, and it carries various legal and financial repercussions. Drivers found guilty of drowsy driving may face penalties such as fines, license suspension, and increased insurance rates. Moreover, in the unfortunate event of an accident caused by drowsiness, the driver may incur legal liability, potentially leading to civil lawsuits or claims for damages. These legal consequences serve as a deterrent and emphasize the seriousness with which drowsy driving is regarded in ensuring road safety.

5. Strain on Emergency Services:

Drowsy driving incidents, particularly those involving large vehicles such as buses or trucks, can place significant strain on emergency services and healthcare systems. When severe accidents occur due to drowsy driving, the consequences can be devastating and require immediate attention from first responders and medical professionals. These incidents often result in a heightened demand for emergency services, including ambulance services, paramedics, and hospital resources. The need for rapid response, specialized equipment, and critical care for injured individuals can stretch the capacity of emergency departments and healthcare facilities. The strain on these services underscores the importance of preventing drowsy driving and promoting driver alertness to alleviate the burden on emergency responders and ensure the availability of resources for other critical situations.

Sleep-deprived drivers responsible for 40% of road accidents, say transport officials

Fatigued drivers are prone to dozing off at the wheels at night, according to them

February 20, 2020 02:53 pm | Updated November 28, 2021 11:26 am IST - KOCHI:

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IV. SOLUTIONS

1. **Awareness:** It is crucial for drivers to understand the importance of getting enough sleep. Educating the public about the risks of driving under the influence is essential, and a mandatory course on intoxicated driving should be included in driver's license requirements. Limiting the maximum driving time and continuous driving duration should also be considered to improve road safety.
2. **Refraining from medication and alcohol:** The use of certain medications, including over-the-counter drugs and sleep aids, can cause persistent sleepiness, and their effects can last for hours. It is recommended to avoid driving after taking medication and to opt for public transport instead. Additionally, driving after consuming alcohol should be strictly avoided, as it increases drowsiness and impairs awareness.
3. **Monitoring driver hours and rest breaks:** Road safety experts advise taking breaks every 15 to 30 minutes when driving for more than three hours. Drivers should not spend more than eight hours behind the wheel in a single day to maintain alertness. Properly scheduling breaks throughout the journey is vital to prevent accidents and driving while fatigued.
4. **Implementing fatigue detection systems:** To identify driver drowsiness and provide timely warnings to prevent accidents, fatigue detection systems utilize sensors to monitor eye movements, breathing patterns, and yawning. Signs such as frequent yawning, intermittent fatigue, and missed turns indicate drowsy driving, prompting drivers to stop and rest.

V. FUTURE IMPROVISATIONS THAT CAN BE DONE ON THE SOFTWARE PART WITH THE HELP OF AI:

Drowsiness detection systems are crucial safety tools that warn drivers to avoid fatigue-related accidents. To keep a watch on the driver's eyes, these systems make use of cameras and sensors. The software can identify partial or protracted eye closures, which indicate sleepiness levels of 40–50%, by evaluating the video stream in real-time. A wake-up alarm that emits an unpleasant noise when drowsiness is detected is set off. Studies show that exhaustion and sleep deprivation are to blame for about 20% of accidents in India. The device collects data from a front-facing camera and uses real-time video processing to determine driver weariness.

This makes it possible to examine the driver's facial features, especially his or her eyes and mouth. Determining the level of risk requires being able to identify these specific facial traits.

- > limiting speed of the vehicle and bring it to a halt with hazard lights on
- > link the software to taxi services like uber and ola to track their driver's alertness.
- > optimization of algorithm parameters for improved accuracy
- > integration with other sensors on the vehicle for comprehensive driver monitoring

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