

DRIVERS AGE AS THE DOMINANT DEMOGRAPHIC FACTOR IN TRAFFIC ACCIDENT

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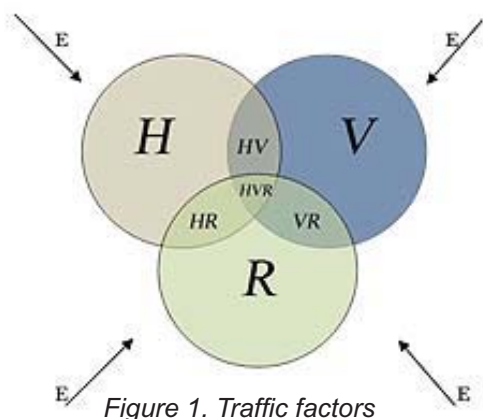
Elements that makes the traffic system, environment, vehicles and human, also represents integral part of any resulting accident. In addition to numerous improvements of vehicles, expansions and improvement of road infrastructure, the number of accidents have been increasing. The main culprit, human, who, with the participation of 57% (when combined with other factors accounts for more than 90%) of accidents, is the weakest link in the chain.

This work covered and explains numerous human factors at which we can affect. The new Law on Traffic safety was taken in consideration. Analysis of accidents in function of the drivers age was conducted. The goal of measures, which have been proposed for suppression and prevention, is declining and reducing negative trends.

Key words: traffic accidents, drivers age, human factors

INTRODUCTION

Increasing number of vehicles on the roads, improving performance and higher average speed have affected that the last decades great importance been given to improved the system of active, passive and catalytic motor vehicle safety. Despite considerable technical progress, it seems that the number of accidents continues to rise. Reports of the World Health Organization show that at 2002. the number of casualties in the middle-income countries was 550.000 while in 2008. this number amounted 940.000 [09]. Traffic accidents occurring as a factor of road, vehicles and humans (Figure 1. [19]).



Several conducted studies have shown that 57 % of all crash cases were due solely to human factor, while in combination with others percentage greater than 90 [02].

HUMAN FACTORS

Distraction

One of the prerequisites for safe driving is attention. When mental resources are not sufficient to meet all the imposed tasks, the driver will see only a limited set of information which he will use for decision making and response to the demanding task. Other information will go unnoticed and be deleted from memory [03]. The causes of obstruction may be varied ; this time we shall focus our attention on two most important: talking with a passengers and cell phone.

Simultaneous vehicle steering and conversation with the passenger leads to processing additional informations, which inevitably brings to reduction of concentration, particularly among young and inexperienced drivers.

Four studies have shown that risk of an accident increases with the number of teens passengers ride with young driver only one almost doubles the risk of accidents, while two or more increase

the risk to five times than driving alone [20].

Form of auditory input, cell phone conversation while driving, greatly contributes to increased risk of accidents. Conducted research have found that older adults (65 to 74) increased time of breaking, following distance and time necessary to reach the previous velocity. On the other hand, young people (18 to 25 years) degraded reaction time to the same level as older who drive without use of cell phone [18].

Fatigue

As a result of physical and (or) mental effort, which occurs during the driving, depending on the intensity, are manifest through: slow reaction and decision making, slow movement control, reduced tolerance for other road users, hallucinations ... Figure 2. [07].

Men under 30 made up about 50% of all accidents that occurred under the influence of fatigue [05]. The importance of this factor is perhaps

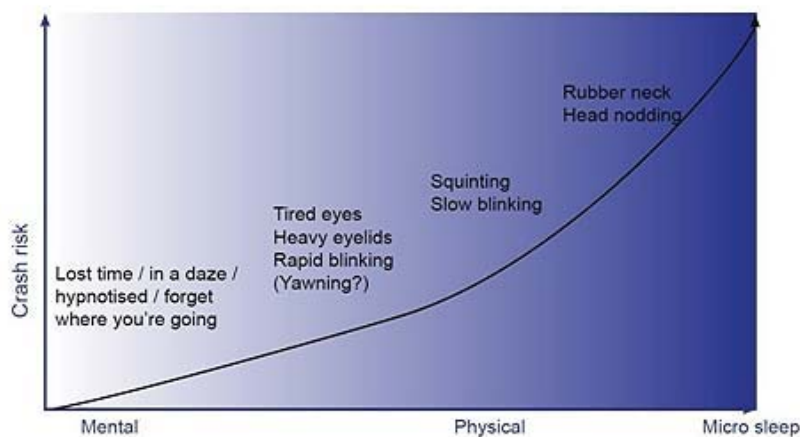


Figure 2. Dependency risks of accidents from fatigue

best illustrated by the fact that the organism after 17 to 19 hours without sleep is in the same condition as when it comes to blood alcohol level of 0.05g/100ml [21]. The most commonly given responses in the fight against fatigue and continuing driving are grouped in Table 1. [13].

Table 1. Obtained answers in testing the driver's habits to combat fatigue

The obtained answers	%
Opening a window / turn up air conditioning	68
Stop and a short walk	57
Listening to the radio / CD	30
Talk with a travel companion	25
Drink Coffee	14
Other	15

At Loughborough University in Great Britain found that the only effect, which is effective more than 10 -15 minutes of these obtained answers, gives caffeine intake of at least 150 mg or fifteen minutes of sleep [06].

Reaction Time

In the narrow sense, corresponds to time of a mental process and represented time required to register and select the type of response [02].

As this is a complex process, for better understanding we can separated it on four main factors [15]:

1. Detection

It begins when driver see object ahead. He can, due to fatigue, deconcentration, poor visibility ... be in sight even before.

2. Identification

Data collection (the object is stationary or moving, estimating the speed ...) and their selection by priorities.

3. Decision

After information collected, it is necessary to decide, whether and how to react.

4. Reply

Moment beginning of decision implementation, ie. contact with the command brakes or turning the steering wheel, which represents the end of the reaction time.

The perception of an objects has a direct influence. It has been found that TTC (time to contact), which can be measured experimentally to study the degree of perception, at elderly adults overestimated, in case of smaller and underestimated in case of higher speed [04,01]. Reac-

tion times in the function of drivers age shown in Figure 3 [15].

Factors that may additionally prolong reaction time are fatigue, stress, tension, alcohol consumption and (or) other opiates ... when the risks of accidents exponentially increases.

Visibility

With age, the quality of vision decreases. Amount of light, which photoreceptors of eye for people over 60 years can register, are two thirds less than for those in their twenties. As a result of adaptation to new situation and the need to maintain the level of visibility, contrast sensitivity decreases.

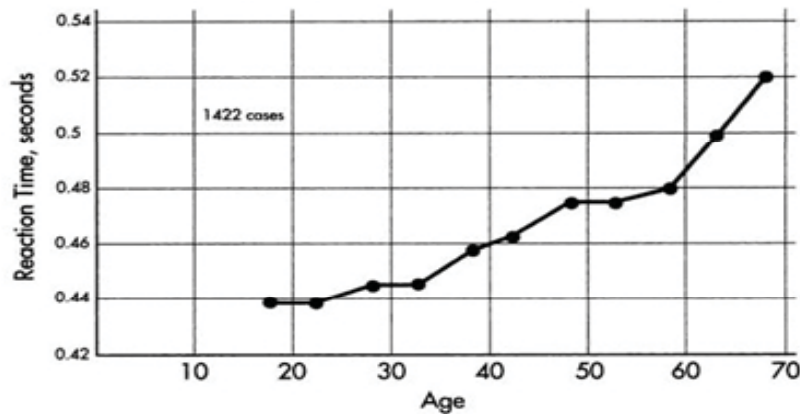


Figure 3. Reaction times in the function of drivers age

At night, when eyes have adjusted to dark, headlights of incoming vehicles, due to sudden changes in light intensity, cause glare. Weakened accommodation at older population, as well as mentioned influence (decreasing the registered amount of light and increased contrast), led to scattering of light and short blindness.

Also, the width of the visual field is reduced which has a direct impact on visibility. Comes to increase the necessary amount of time and heavier spotting a pedestrian on other side of the road, parking, inclusion of vehicles from adjacent streets... [08]. Factors and their impacts are shown in Table 2 [16].

Table 2. Visual factors and potential risks

Visual factor	Definition	Related driving tasks
Accommodation	Change in the shape of the lens to bring images into focus	Changing focus from dashboard displays of the roadway
Static visual acuity	Ability to see small details clearly	Reading dashboard displays
Adaptation	Change in sensitivity to different levels of light	Adjust to changes in the light upon entering a tunnel in daylight
Angular movement	Seeing objects moving across the field of view	Judging speed of cars crossing our path of travel
Movement in depth	Detecting changes in size of the image on the eye	Judging speed of an approaching vehicle
Color	Discrimination of different colors	Identification of colors of signals
Contrast sensitivity	Seeing objects that are similar in brightness to their background	Detection of dark-clothed pedestrians at night
Depth perception	Judgment of the distances of objects	Passing on two lane roads with oncoming traffic
Dynamic visual acuity	Ability to see objects that are in motion relative to us	Reading traffic signs while moving
Eye movement	Changing the direction of gaze of the eyes	Scanning the road for hazards
Glare Sensitivity	Ability to resist and recover from the effect of glare	Reduction in visual performance due to headlight glare

Other factors

Alcohol is one of the biggest causes of traffic accidents. Depending on the entered quantities, it affects on vision (reduction acuity and constriction of visual field), concentration, reasoning ... The same goes for drugs - reaction time decreasing, weakening motor functions, assessment ... Most accidents under these influences is among young people. In contribution to this speaks exploring from 2009. by the U.S. government for road safety, showing that concentration of alcohol and / or drugs while driving by persons from 21 to 25 years is the most common, 24.8%, after which followed gradual decline [14]. Difficulties at detecting some drugs in the body and false images which occur are serious problem. Smoking marijuana cigarette leaves low level of trace after three to four hours, while the effect lasts for the next twelve or more. [16].

MATERIAL AND ANALYSIS

From previous studies of human factors which were presented in this paper and their impact on ability to drive, we can conclude that age, to a lesser or greater extent, represents the common denominator.

The study group comprised 200 persons - drivers, selected with method of random choice who had in period of six months at Delta Generali insurance reported accidents as a damaged /

harmful side. The group consisted from males and females, aged 18 to 75 years. It was expected that data demonstrate a degree of compliance with other tests where, direct or indirect, demographic features was included in the analysis. The results are shown graphically (Figure 4).

The largest share is among people aged 18 to 30 years, after which number of accidents decreases. Young people, although naturally predisposed to be a better drivers-thanks to shorter reaction time, better coordination of movement, psychomotor skills ... because the lack of social responsibility, maturity and experience in traffic, are participants in a larger number of accidents.

Excessive security, risky driving style and inability to recognize and react in dangerous situation made pretty dangerous combination. Jump that occurs at people over 65 years of age are caused by numerous consequences that were mentioned in previous discussion with reference to the section that follows.

DISCUSSION

Exposed research, statistics and facts that been presented in this paper should drawn attention to the seriousness of the issues which in public haven't got attention to the extent it deserves. The current situation is such, that predictions, Figure 5, has not encouraged. [22].

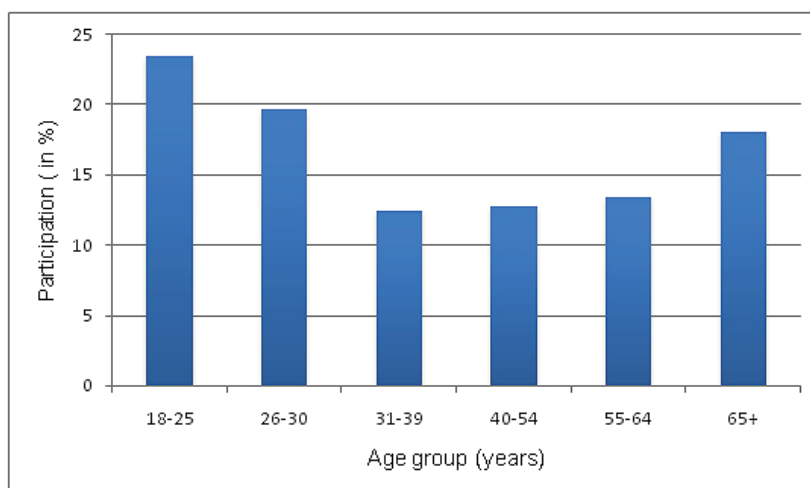


Figure 4. Participation of traffic accidents in the function of the drivers age

It is necessary to investing more in scientific research, for the sake of detecting the causes and suggestions for their prevention, and traffic regulations which will adequately, through the implementation of these informations into new or existing legislation, lead to reducing the number

of traffic accidents. Implement more active traffic education for children and young people through educational institutions, acting through media, with emphasis on those who are most represented among young - television and internet ...

Training of drivers in driving schools, in addition to acquiring basic skills and knowledge, must provide more. Introduce and show how to react in emergency situations; predicting, spotting mistakes of other road users and adequate responses to them. Conducted Republic research indicated that just over 1% of rear-seat passengers used seat belts [11].

Importance of preventive measures through the demonstration is one of the best ways to individual understand, how rules and laws are not there to kept him limited or hindered. A good example of this can be activities of the National driving academy and use simulators for frontal impact and rollover.

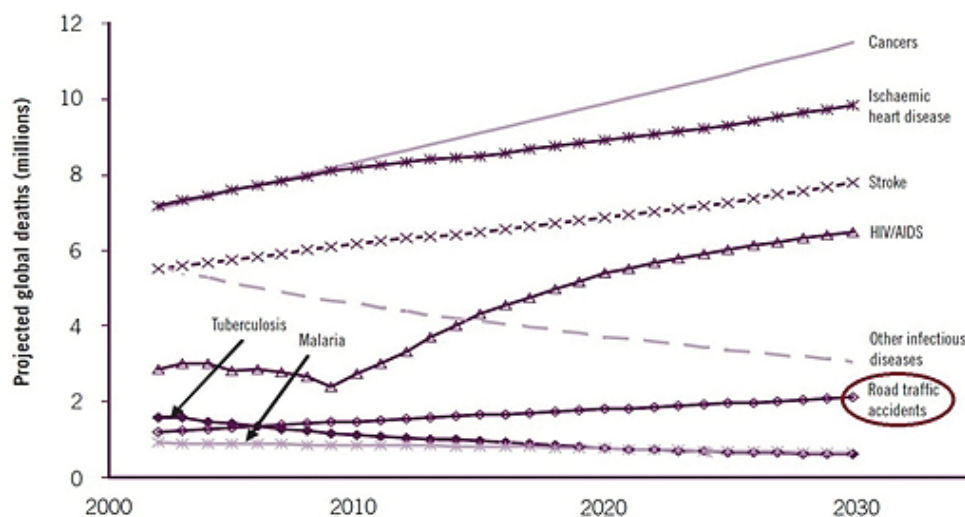


Figure 5. Projected deaths for selected causes to 2030

What about elderly people (over 65)? Regulations, governing what kind of health condition must be a driver, was written at 1982. Studies speak in favor that it would be desirable to introduce a ban on cell phone use, in a manner anticipated with new Law on traffic safety for novice drivers [23,12]. Also, driving at night, for reasons already explained, significantly increases the risk. The introduction of the test, which would checked the ability of potential collisions during the necessary controls required for driver license extension [01].

CONCLUSION

It is necessary to pay more attention and resources to testing and implementation of preventive measures.

Also, seen from the point of cost-effectiveness, presented proposals along conducting detailed analysis and working on their application and implementation is significantly more cost-effective than the amount of material costs that result from accidents, with a reminder that life has no price.

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Paper sent to revision: 08.06.2011.

Paper ready for publication: 13.09.2011.