

An Analysis of Traffic Accidents in Libya, and Some Mitigation Strategies

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Abstract: The Economic growth in Libya in recent decades also led to a stunning growth in the number of vehicles on Libyan roads, which is easily the key factor responsible for an alarming increase in the incidence of traffic accidents. Population congestion and increasing numbers of motor vehicles, which is accompanied by consequent traffic accidents that lead to the loss of life and property. Traffic accidents in Libya are economic and social problem, burden and loss implied to the country, making Libya one of the worst affected countries in the world with respect to Traffic accidents and injuries that lead to the death 6.5 people in day - an astounding statistic, given the small population. The dramatic rates of increase in traffic accidents and injuries in Libya Will lead to the deaths of 25 people per day in the coming years if the government takes appropriate and effective for reduce road traffic accidents. This paper suggests some solutions thereto.

Key words: road accidents, vehicles, reduce, and deaths

INTRODUCTION

The increases in the number of vehicles on the roads are a phenomenon that has been observed to parallel economic growth, particularly in recent years. Along with increasing vehicles, traffic accidents have also increased in tandem. In the Arab world, Libya has relatively less vehicles on the roads, compared to other countries. However, ironically, Libya witnesses one of highest incidents of traffic accidents among all Arab countries. (M.O.I 2008) – a situation that is worsening with increasing traffic accidents every year , in age group of 12 to 29 years , traffic accidents are a major cause for death in the world, especially in developing countries and in the age group between 30 to 45 years it's the third leading cause of death . WHO report 2010 revealed that more than 50 million people are injured and more than 1.3 million people die from traffic accidents. World Health Organization 2010 indicated that due to the lack of availability of road safety in developing countries, traffic accidents rose by 70 % and due to the lack of adequate attention to road safety and infrastructure. In developing countries, the traffic accident problem is yet to be adequately studied to determine the causes and solutions thereto, and to develop effective and preventive policies and strategies. Thus, this journal reviews the trend of traffic accidents and injuries in Libya from 1995 to 2010 (Table 1) to determine the key causes thereto, and to propose solutions to reduce

Table 1: Population registered vehicles and Road traffic accidents (1995 to 2010) .

| Years | Population | Vehicles | Killed | Injured | Accidents |
|-------|------------|-----------|--------|---------|-----------|
| 1995 | 4.399 | 109.750 | 1296 | 7703 | 8419 |
| 1996 | 4.516 | 134.883 | 1080 | 7750 | 8437 |
| 1997 | 4.645 | 165.771 | 1119 | 8076 | 9278 |
| 1998 | 4.778 | 203.575 | 1224 | 8343 | 9393 |
| 1999 | 4.914 | 411.534 | 1204 | 8394 | 9370 |
| 2000 | 4.125 | 675.257 | 1504 | 9617 | 10667 |
| 2001 | 4.300 | 809.056 | 1598 | 10033 | 10895 |
| 2002 | 4.485 | 1.008.528 | 1751 | 11058 | 12017 |
| 2003 | 4.679 | 1.126.901 | 1744 | 10502 | 12154 |
| 2004 | 4.883 | 1.225.704 | 1785 | 10746 | 11643 |
| 2005 | 4.098 | 1.310.530 | 1800 | 11541 | 11898 |
| 2006 | 4.324 | 1.508.359 | 1866 | 12164 | 11928 |
| 2007 | 4.422 | 1.826.533 | 2138 | 13497 | 13165 |
| 2008 | 4.466 | 2.052.679 | 2332 | 13725 | 13352 |
| 2009 | 4.400 | 2.342.536 | 2301 | 13851 | 13664 |
| 2010 | 4.561 | 2.242.385 | 2375 | 14025 | 15655 |

Source: Traffic Office and Licensing of Tripoli 2011

Background:

Libya, Arab country and is located on the Mediterranean coast. Bordered from the south of Chad, Niger, north-west Tunisia, and Algeria to the west and the east of Egypt, Sudan and the south-east. The number of

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population of Libya 6.561 million people, a little compared to an area of the country that is around 1,800,000 square kilometers, and is the seventh of ten in the world in terms of area (UN Demographic Yearbook, 2010) Libya of Africa's largest country in area, as it has as it has the longest coastline between the countries bordering the sea average length of around 1955 km². Libya has the highest Human Development Index in Africa and the fourth highest GDP in the continent in 2009, after Seychelles , Equatorial Guinea and Gabon . This is due to its large oil reserves and low population (Annual Statistical Bulletin, 2010) Libya has the tenth largest proven oil reserves in the world and ranks seventeenth in global oil production (OPEC 2009).



Fig. 1: The location of Libya - Source (<http://www.libyana.org/cities/index.htm>).

Methodology:

All determinations of the problems and prevention of traffic accidents would only be as accurate as (availability and reliability of) In developed countries, road accidents data comes from many sources as insurance companies, hospitals records, traffic offices and police offices, but the case is different in developing countries, and police records are the only source of data of traffic accidents. The statistics of traffic accidents and injuries used in this study obtained of Ain Zara police station and the annual report on traffic accidents too (1995-2010) which contains number of populations , injuries and the victims ,the gender of the victims and the time of the accident and its causes .The data were statistically analyzed to know the relationship between populations and vehicles numbers and The increase in number of traffic accidents .

Problem Description Methodology:

RTAs in Libya may involve any of: buses, bicycles, cars, motorcycles, trucks and pedestrians. Every day in the world die 1.3 million people and about 50 million are injured each year from traffic accidents (WHO 2010) the number is likely to double in the coming years if measures are not taken to reduce and especially in developing countries , as show (table 2)

Table 2: Higher mortality rate for road accidents 2010.

| Country | Deaths | Deaths per 100.000 |
|-------------|--------|--------------------|
| Egypt | 19.983 | 41.6 |
| Libya | 2.138 | 40.8 |
| Afghanistan | 1.179 | 39.0 |
| Iraq | 1.932 | 38.1 |
| Angola | 2.358 | 37.7 |
| Ethiopia | 2.441 | 35.0 |

Source: global status report on road safety .Geneva 2009

Increasing growth in economic and social activities has led to increasing numbers of vehicles on the roads and this, in turn, helped to increase traffic accidents in countries of the world, especially developing (Mohamed S. Belker and Bubaker M. Bensaleh, 2010). The number of registered vehicles increased during the period from 1995 to 2010 from 109.750 to 2.424.385 million vehicles. Drastically population density increased, especially in the city of Tripoli, amounting up to 1273.7 people per 835 km² as show (Table 1.2) (Figure 1.2) also number of traffic accidents deaths increased and recorded 2375 killed in 2010. A rate 6.5 killed per day (GAIS, 2010). This number will rise in the coming years and government should establish a National Programmer to reduce this problem and especially in Tripoli city which suffers from congestion every day due to:

- The presence of all government departments within the city center.
- Increasing numbers of private cars.

- Most internal streets are unpaved.
- Poor public transport network between cities

Table 3: Distribution of population and area in Libya.

| No- | States | Area km ² | Population | Density |
|-----|------------------|----------------------|------------|---------|
| 1 | Batnan | 84.996 | 150.353 | 1.86 |
| 2 | Dam | 31.511 | 155.402 | 5.17 |
| 3 | Algabel Alakder | 11.429 | 192.689 | 18.04 |
| 4 | Al marj | 13.515 | 175.455 | 13.65 |
| 5 | Benghazi | 11.372 | 622.148 | 59.35 |
| 6 | Al wahat | 108.523 | 164.718 | 1.65 |
| 7 | Al kufrah | 433.611 | 42.769 | 0.11 |
| 8 | Sirt | 86.399 | 131.786 | 1.64 |
| 9 | Misurata | 29.172 | 511.628 | 18.62 |
| 10 | Margheb | 6796 | 410.187 | 62.96 |
| 11 | Tripoli | 835 | 997.065 | 1273.7 |
| 12 | Al joufrai | 2666 | 422.999 | 169.23 |
| 13 | Al zawia | 2753 | 270.751 | 105.57 |
| 14 | Zuwarah | 6089 | 269.553 | 47.19 |
| 15 | Al gabal algarbe | 76.717 | 288.944 | 3.95 |
| 16 | Naluti | 67.191 | 87.772 | 1.40 |
| 17 | Al joufrah | 139.038 | 46.899 | 0.37 |
| 18 | Al shate | 90.244 | 73.443 | 0.87 |
| 19 | Sabah | 17.066 | 119.038 | 7.81 |
| 20 | Wadi al haya | 31.485 | 70.711 | 2.42 |
| 21 | Ghat | 68.482 | 21.329 | 0.34 |
| 22 | Muraek | 356.308 | 72.513 | 0.22 |
| | Total | 1.676.198 | 5.298.152 | |

Source: GAI, census 2006

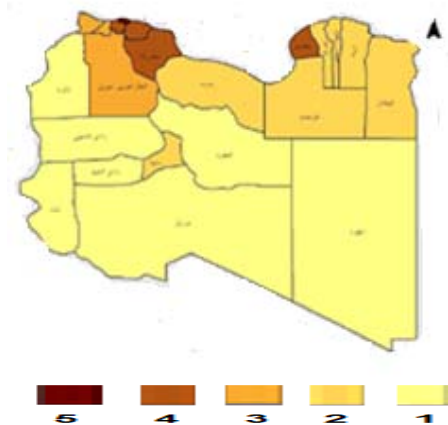


Fig. 2: Population density
5= high density 1= low density

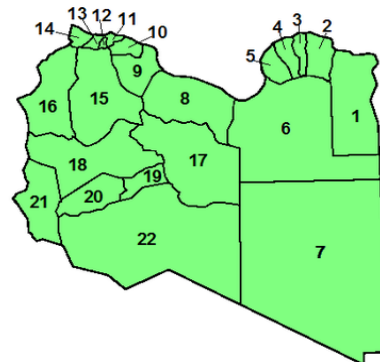


Fig. 3: Location of states as (table 3).

Traffic accidents in Libya:

Discovery of oil in Libya 1960 and had an impact on the national economy of the country and national income per capita. Libya has become the largest per capita income among African countries with an estimated per capita income of about 12 thousand USD in 2010. The gross per capita income increased by about 676 percent in 1960, and continued to rise to nearly 480 percent in the early seventies (Human Development Report, 2011). Increased number of vehicles from 109.750 to 2.052.679 furthermore, traffic accidents has increased dramatically, high rate of traffic accidents in the youth age group of 18 to 35. In 2010, there were 2,375 deaths on roads in Libya as shown in figure (4). One of the most serious losses in Libyan lives originates from vehicles and road accidents (WHO 2009).

Passengers and car driver's, were higher values of road user deaths 28% and 32% followed by the pedestrians 15% and cyclists 5%, as show in (figure 5)



Fig. 4: Traffic accidents (1990- 2010).

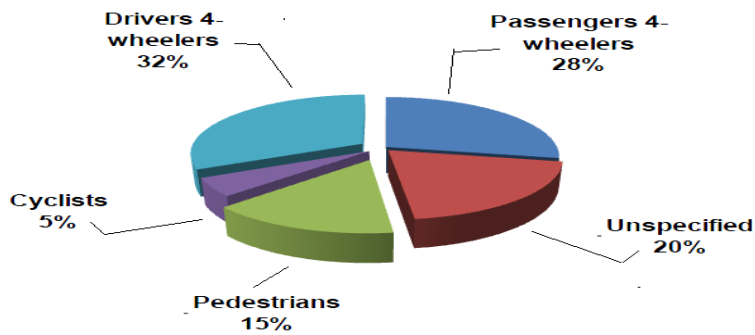


Fig. 5: Higher road user deaths in 2010.

Data and Analysis:

The independent variable of population and vehicles is displayed and is significant in the regression model and number vehicles and population can explain 93.5 % of variation in number of total accidents, in ANOVA analysis as show(table 5) F= 201.044 which is significant at 0.05 levels, showed that the regression model is significant.

Table 4: Determinant of road accidents

| Model Summary | | | | |
|---------------|-------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .967 ^a | .935 | .930 | 541.07403 |

1. Constant , vehicles , population
 2. Dependent Variable : Total of accident

Table 5: ANOVA.

| ANOVA | | | | | | |
|-------|------------|----------------|----|--------------|---------|------|
| Model | | Sum of Squares | Df | Mean square | F | Sig |
| 1 | Regression | 58857943.009 | 1 | 58857943.009 | 201.044 | .000 |
| | Residual | 4098655.429 | 14 | 292761.102 | | |
| | Total | 62956598.437 | 15 | | | |

1. Constant , vehicles
 2. Dependent Variable : Total of accidents

Regression coefficient in depended variable (vehicles) in relation to traffic accidents is significant at 0.05, but in variable (population) < 0.05 .that’s meaning there is a strong relationship between vehicles and total of accidents. That’s meaning more vehicles give us more accidents, as it happens in Libya as show (Table 6) the increasing number of vehicles, exceeded roads capacity in and which led to traffic jams sometimes fatal.

Table 6: Regression independent.

| Coefficients ^a | | | | | | |
|---------------------------|------------|-----------------------------|------------|---------------------------|--------|------|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 8646.356 | 235.122 | | 36.774 | .000 |
| | vehicles | .003 | .000 | .967 | 14.179 | .000 |

a. Dependent Variable: total of accident

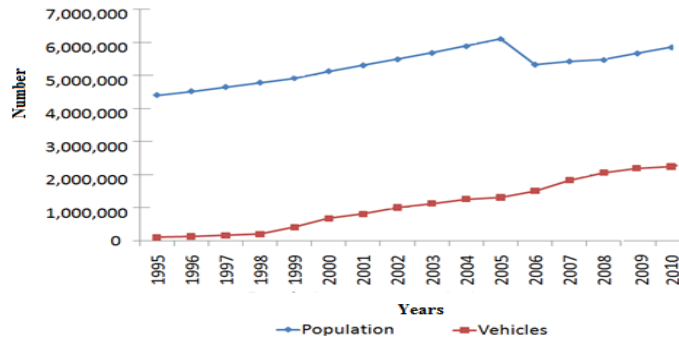


Fig. 6: The relation between vehicles and population (1995-2010).

Traffic accidents in Libya lead to humanitarian and social losses and not only material losses, whose evidence is quite clear in the data analyzed herein, as seen (figure 1.4), the number of Libyan traffic deaths rose alarmingly between the 1995 and 2010, The increase in number of population clearly leads to an increase in vehicles in roads (Amiruddin Ismail, Adel Ettaieb Elmloshi 2011) RTAs increased dramatically in the last years as show (table 1) .In 2010 reaching to 2.424.385 vehicles while number of population was 6.561 million and increased the ratio of vehicles to population to 2.7 people per vehicle. In terms of population density and area, Tripoli less area 835 km and more densely populated around 1.800.000 million people (statistics 2010) as show (Table 1.3) (Figure 1.2). Due to the difficulty of life in the desert regions most people prefer the coastal areas and disparity in the population distribution across the cities has impact, economic, social, security, and population density on the main coastal cities — wherein the crowded city of Tripoli is most prone to increase of vehicles on the road, traffic congestion, and overcrowding in public institutions — which all lead to the consequent rise in traffic accidents. Many factors influenced the traffic accidents in Libya internal and external as United Nations sanctions on Libya (1996) and which even led to an increasing number of flights between Libya's cities and neighboring countries and there are does not another option for travel between cities just by vehicles

Conclusion:

Road traffic accidents in Libya in addition to his social and economic impact on the victim, his family and the nation as a whole also has a health effect, and led to the death of 6.5 people a day (statistics 2010) . The problem is not intractable and the death toll could be greatly reduced if appropriate measures were carried out by the government.

Recommendation:

Road traffic accidents can not be removed entirely, but the government can help in the reduction of the problem and that's with the help of citizens, engineers, police officers and traffic. The following are some suggestions from the road safety perspective to reduce traffic accidents in Libya as inspired by (the International Symposium for the prevention of traffic accidents in Tripoli, 2009).

- Citizens must adopt adequate and safe traffic culture; the media has a crucial and facilitating role to play here.
- In the end of the week, efforts of the traffic police system must be intensified and especially on Wednesday and Thursday which witness the greatest occurrence of social visits and trips.
- Stern enforcement of traffic law must be established, and should be imposed firm punishments to those who have penetrated into law.
- The Libyan government needs to encourage people to use public transport between cities and needs to regulate the importation of foreign vehicles that would otherwise be used for purposes of pleasure only.
- Encourage people to use seat belts and seats for children, would be an easy, simple and effective measure in reducing the fatalities and injuries pertaining to traffic accidents.

- There should be a more rigorous testing procedure before the issuance of driver's license for ascertaining theoretical and practical driving skills.
- Should improve road networks linking small towns with large cities.

ACKNOWLEDGEMENT

The research was conducted in collaboration with the Sustainable Urban Transport Research Centre (SUTRA), Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia.

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