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“GREEN DRIVER” – A SOLUTION FOR IMPLEMENTING THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT

1. Effects of road transport on environment and human health

Transport is a vital part of the economic activity of human society, organized for efficient organization in space and “defeating” distances¹.

Public transport is a transport category organized by specialized companies that are made available without any discrimination to the clientele of passengers or freight consigners under a delivery versus payment agreement.²

The role of public transport is particularly important because it connects settlements, ensures freedom of movement of people and goods, and makes the connection to international transport network, contributes to the socioeconomic development of the country and not least it achieves a sustainable transport in accordance with the requirements of the European Union.

Public road transport has the advantage that it has great mobility, moving at high speed, low cost and has the highest efficiency over short distances.

The disadvantage of this transport is the relatively low capacity and hence for larger quantities or a high number of people it requires a large numbers of vehicles, many drivers and on long distance this is tiresome.

Road transport has an increasingly important share in the transport structure in Romania. The percentage of goods’ transit is much lower as compared with the quantities moved, because this mode of transport is used mainly on short and medium distances where it has maximum efficiency.

The structure of transported goods is diverse and is very similar to that of goods transported by rail.

From the point of view of competition it may be:

a) Intra-modal: which is very strong due to the large number of auto transport companies. It can be noted, however, less competition in areas that require large startup investments (which require expensive terminals) such as: liquefied gases, chemicals, frozen products, etc.;

b) Intermodal: this is particularly manifested through railways but things were regulated in the sense that auto transport is carried out on smaller distances than rail.

¹ Fistung, D., - Transporturi. Teorie economică, Ecologie, Legislație, Editura All Beck, București, 1999.

² Sima, E., - Managementul transportului public, Editura Academia Forțelor Terestre „Nicole Bălcescu” din Sibiu, 2011.

Road transport owes its development to the characteristics of its services, by:

- a) Accessibility, which for the road transport is the highest;
- b) Commercial speed (of the cargo) is relatively high and it is also supported by the fact that auto means are not running according to a fixed schedule, being able to leave immediately after the loading was finished;
- c) Low capacity of transport enables maximum use of capacity utilization;
- d) The high degree of protection of goods is due to enclosed storage spaces of goods and suspensions' performance;
- e) Reduced duration of the charge is also related to the relatively low capacity of the vehicles.

Most auto transports do not use terminals, using the "door to door" method, but activities related to incomplete cargos and not only, requires mandatory terminals, which may be: collection and distribution terminals, separation and regrouping and rest terminals.

a) Collection and distribution terminals are held usually in cities. Small expeditions are brought by low load capacity vehicles, and then the selection on destinations is made, to complete the load of line vehicles. On the arrival of loaded line vehicles the process is reversed. In such terminals other operations can be made, such as: sales, billing, cargo storage, current repair station, etc.;

b) Separation and regrouping terminals are usually placed between collection–distribution terminals;

c) Rest terminals are required by the regulation of the driver's working hours.

Economies of size are less significant in auto transport. They are achieved through intensive use of the car park, being obvious for carriers of incomplete cargos.

In the development of road transports the increase of the number of people traveling with their own vehicles and the degraded state of many roads are mentioned, despite rehabilitation works which have increased significantly in recent years. However, Romania is ranked last in the motorization chapter in the European Union, according to figure 1.

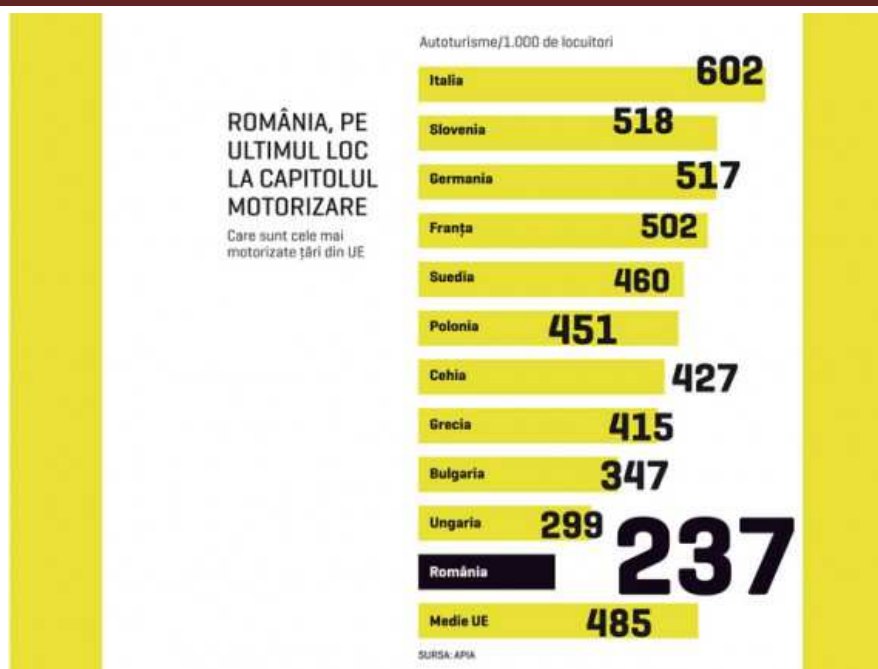


Figure 1. Top motorized countries in the European Union

Source: Un timbru peste un mediu din ce în ce mai poluat / A stamp over a growing polluted environment (<http://www.businessmagazin.ro> accessed 26.05.2014)

The number of used cars is growing in Romania and they increase the level of pollution.

The number of second-hand cars registered in Romania was almost four times higher than in the case of new vehicles, according to data from the Directorate for Driving Licenses and Vehicle Registration (DRPCIV)³.

According to official statistics, during January to February 2014, there were 30.618 registered used car units, down 10,52 % compared to the same period in the previous year, when there were 34.219 units. However, the number is 3,5 times higher than that recorded in the case of registrations of new cars, which reached 8.768 units. In the classification of used vehicle sales Volkswagen is by far the leaders, with 8.608 units, followed by Opel - with 5.416 units, and Ford (3.581 units). They are followed by Audi (2.094 units), Skoda (1.346) Mercedes-Benz (1.223) and Renault (1.195). On the segment of rare second-hand cars, DRPCIV data mentions: Porsche (35), Jaguar and Jeep (16 each), Lexus (5), Lada (3), Ferrari, Maserati and Infiniti (two units of each).

³ România, țara rablelor: O mașina nouă la patru second-hand, <http://www.ziare.com/auto/accesat> 26.05.2014)

According to DRPCIV, national car park in Romania reached at the end of 2013, about 5,98 million units, up with 4,73 % compared to the same period in 2012. Of this total, 4.693.651 were cars and 3,3 million had gasoline-powered engines.

From the national parking lot of 1,91 million vehicles were 6-10 years old and 1,42 million units had a degree of wear between 11 and 15 years. Of these 1,14 million cars were older than 20 years.

Overall, it can be stated that 2,35 million Romanian preferred diesel cars and 3,32 million gasoline-powered cars.

The main problems that increase the impact of road transport on the environment are:

- fuel quality;
- insufficient intersection nodes on the highways, stations and modern parking lots;
- poor quality of road cover, especially in neighborhoods;
- parking of cars in yards, on the green areas and walkways;
- long exploitation and unsatisfactory technical condition of transport units, etc.

Road transport has a significant contribution in producing climate change. Road transport is almost entirely dependent on oil. Oil, along with other fossil fuels such as coal or natural gas, are the main sources of carbon dioxide, which along with other greenhouse gases cause major changes in the climate system.

The effects of pollution by road on the environment and people can be both direct, due to exposure to various pollutants and climatic phenomena and indirect, because of the activity of pollutants on water, soil, vegetation and fauna.

Road transport makes its mark in all environmental factors by:

- congestions and accidents;
- air pollution by emissions of heavy metals and pollutants;
- noise and vibration – in major intersections, along the roads, etc;
- soil, water pollution by spillage of petroleum products;
- occupation of land in urban areas for parking;
- change of eco-urban landscape;
- generation of solid waste (used tires, batteries, etc).

Among the negative effects that road transport has on health of population, there should be mentioned those related to the harm of exhaust gases containing NO_x, CO, SO₂, CO₂, volatile organic compounds, heavy metals particles (lead, cadmium, copper, chromium, nickel, selenium, zinc). These emissions, along with entrained dust on the road, can cause acute and chronic respiratory problems, but also the worsening of other diseases. Heavy traffic generates high levels of noise and vibrations, and also a permanent background sound, which leads to stress, with major implications

for health in general. Emissions of pollutants such as nitrogen oxides, hydrocarbons, carbon monoxide, dust, cause or intensify a range of health problems. Traffic impact on health leads to a higher occurrence rate of cancer and heart diseases, respiratory problems and their aggravation. Technological improvements that have reduced emissions were offset by the increase in traffic, so that overall emissions are still rising.

Noise from traffic affects people in different ways causing both discomfort and health problems. Among the harmful effects of road transport on the physical state of the population there can be mentioned: a higher heart rate (which leads to an increased risk of cardiovascular diseases), psychiatric disorders and an increased level of stress, sleep disorders, cognitive, understanding and concentration problems at children and not only, and at very high levels of noise, hearing problems.

Traffic exhaust gases contribute to atmospheric acidification and tropospheric ozone formation, with direct and/or indirect effects on all components of the environment, flora and fauna, soil and water. The presence of heavy metals in the exhaust gases affects soil and water quality and also the health of flora and fauna.

Transport is the second most important source of emissions of greenhouse gases in Europe, accounting for over 20% of the total, according to surveys by the European Environment Agency. According to reports, the main sources of greenhouse gas emissions are: energy industry, with 31% of the total, followed by transport (20,3 %), residential and commercial emissions (14%) and construction and manufacturing industries with 11% of the total. Also, an independent report published by the Energy Information Administration (EIA) from the United States shows the total amounts of carbon dioxide emissions in Europe, placing Romania on the 28th place, with an annual value of 86 million tons. Romania is surpassed in this classification of countries such as: Slovakia (34 million tons/year), Switzerland (43 million tons/year), Denmark (46 million tons/year), Norway (45 million tons/year) and Hungary (49 million tons/year).

There should also be mentioned the pollution of soil with different waste, especially in parking lots, with oil products from some faulty vehicles and various substances from road accidents.

In order to reduce transport emissions, many activities were organized in Romania. In collaboration with representatives of the Romanian Auto Register, roadside control actions for verifying emissions were conducted. Coercive measures were applied when admissible limits were violated. The auto parking lot was renewed through the implementation of the Program to stimulate the National Car Park's Renewal.

The most appropriate way to reduce environmental pollution and limit the negative effects on human health is the proper operation of means of transportation, effective and correct organization of automobile traffic,

giving up own cars for public transportation means and even giving up any vehicle whenever possible in favour of walking, cycling.

2. “Green driver” a solution to reduce environmental pollution and decrease its harmful effects on population’s health

The concept of “green driver” does not refer to those drivers who bought cars with zero pollution or who sell their car and ride the subway. It is about ordinary drivers who have cars, but they can show love for nature by reducing pollution and fuel consumption, says an article in the British newspaper ‘The Times’⁴.

The solution is adopting a responsible driving style, car maintenance in a good condition and creating associations with friends from work, so three or four people fit in a car.

In general we can not rely on figures provided by the producers when it comes to the actual consumption of the vehicle because their tests are made in laboratories, when the engine is new and the tires are flawlessly blown tight.

Bad roads break the planetary gears, but at the same time cause higher fuel consumption.

Experts say that having a car bought at least two years ago, a European driver can save at least 35% of usual consumption if he maintains the car well and changes his driving habits a little.

The first condition mentioned by them is to balance the tires. If the wheels are fully blown tight and well balanced, fuel consumption is reduced and usually one can get an 8% decrease in fuel consumption. In addition, another at least 10% of the gasoline can be saved by adjusting the engine and checking the technical condition of the car at least once a year. The difference of 17% of consumption will be saved by reducing speed in the city and on the motorways with a speed as constant as possible and as close to that recommended by the manufacturers.

Here are some rules that if followed will reduce fuel consumption⁵:

- It is not recommended to speed up in town!
- The average speed of 60km/h is ideal for heavy traffic;
- The “economic” speed of the car on the highway is usually around 120km/h;
- It is not recommended to brake suddenly. Gradual change has been shown to reduce pollution by 6%;
- It is recommended that twice a year to take the car to the service because it was demonstrated that a well-tuned engine helps save fuel;

⁴ [Adevărul](#), 25 Iun 2012

⁵ Arta de a conduce mașina în mod ecologic, <http://www.ecomagazin.ro> (accesat 28.05.2014)

- Tire pressure is very important because soft wheels rub harder and thus consume more fuel.

Nowadays there are plenty of devices that can help the driver “green” how to drive. One of the most useful is the one showing how much fuel the car consumes.

It was found that sudden acceleration or braking influence only very little fuel consumption, but contributes to the deterioration of the functioning of the gear motor rhythm, which can lead to burning of oil that greatly increase pollution.

It was verified that nervousness during driving or engine runaway when the car is at stop or careless driving, which requires other drivers to make sudden maneuvers are very harmful to the environment. British researchers have shown that pollution increases by about 8% if drivers are under stress and engine runaway at the stop sign doubles the nuisance issued.

The greenhouse effect has been demonstrated to produce a multitude of disasters worldwide and certainly states will restrict polluting cars, so that drivers are not encouraged to buy or use them.

British people recommend the electric cars or those fuelled by combustion and hydrogen cells, which have zero pollution. These work well in traffic with acceptable start-up and many states have installed hydrogen pumps or battery charging stations. The 120 mg of carbon dioxide per kilometer threshold is currently the widely accepted solution for the EU Member States.

Diesel cars can work with “green” blends of fuel, made from oil and ethanol or vegetable oils. Through combustion such a fuel produces less carbon dioxide which is considered to be more environmentally friendly.

3. Conclusions

Transportation is the circulatory system of any economy.

Transport provides mobility in time and space of people and goods.

All modes of transportation adversely affect the environment and have adverse consequences on health.

Although significant progress has been made in technology and fuel, pollution from transport still remained alarming, the main cause being the decrease in the number of occupants per vehicle.

Road transport which has developed greatly in recent years is the most harmful to the environment and human health.

The European Union is very concerned with maintaining human and environmental health and imposes strict conditions in this regard.

The art of leadership can transform an average driver into a “green driver” that can lessen the harmful effects on the environment and human health while acting on reducing fuel consumption and maintaining the optimal operating condition of the vehicle.

Significant reduction in fuel and wear, increasing the life of a road transport means, depends on its functional characteristics and on the technical knowledge and ability of the driver. Such economic leadership increases traffic safety, protects the environment, reduces the driver's stress and of the other drivers.

There are concerns in this regard so, for example, Renault Trucks is looking for the most ECONomical driver during Optifuel Challenge competition in 2014. Also, instructors from ProfiTraining German team, Daimler AG partners being in a tour in Eastern Europe have held near Sibiu an Eco training course in road safety program Mercedes-Benz Driver's Training Road Show for Romanian transport companies, truck drivers respectively. Training courses were both theoretical and practical.

Another example is the recently launched Volvo Trucksce global competition "The Drivers' Fuel Challenge", dedicated to driving efficient. The aim of the competition is to identify the driver who runs as economically as possible on a well defined route.

REFERENCES:

1. Fistung, D., - Transporturi. Teorie economică, Ecologie, Legislație, Editura All Beck, București, 1999.
2. Sima, E., - Managementul transportului public, Editura Academia Forțelor Terestre „Nicole Bălcescu” din Sibiu, 2011.
3. *** [Adevărul](#), 25 Iun 2012.
4. *** <http://www.ziare.com/auto>, România, țara rablelor: O mașina nouă la patru second-hand, ([accesat](#) 26.05.2014)
5. *** <http://www.businessmagazin.ro>, Un timbru peste un mediu din ce în ce mai poluat ([accesat](#) 26.05.2014)
6. *** <http://www.ecomagazin.ro>, Arta de a conduce mașina în mod ecologic, ([accesat](#) 28.05.2014)