

## Impacts of congestion in the city of Batna, Algeria

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### **Summery:**

*The improvement of the living conditions requires that an increasing attention be given to the fight against the various nuisances effects which characterize the use of the motor vehicles: the Network congestion, the road insecurity, air pollution, noise, etc... In this article we will present a study on places affected by the congestion in the city of Batna. The results obtained enabled us to formulate a set of recommendations relating to the organization and the management of transport.*

**Keywords:** congestion, noise, city, crossroads.

### **Introduction**

The transport is clearly one of the main factors of economic and social development, its contribution is particularly important as long as mobility is necessary to any activity. Only it did not bring the progress it has led many nuisances that are visible through the following impacts: occupation of the grounds, the emission of gases and noise, the attack with health and the degradation of the landscapes. The improvement of living conditions requires attention to the fight against nuisances that characterize the use of vehicles particularly air pollution and noise. Algerian cities are not with shelter of this phenomenon of congestion of transport infrastructure. Through this study, we try to approach the reasons that have as a city Batna, whose creation is relatively recent, it has been the subject of many studies of development through the various plans and it presents today problems of transport which risk if they are not solved to compromise any harmonious development of the city.

### **1 - Description of the impacts of the congestion on the environment and the framework of life:**

There does not exist universally accepted definition of the road congestion. . It may, however, usefully retain the following definition The congestion is defined as the embarrassment which imposed by vehicles to each other, because of the relation existing between the speed and the traffic flow, under conditions where the use of the transport system closes the capacity to of this system.

The congestion has consequences for:

- Users: In terms of degradation of transport conditions, a source of discomfort, stress and tension and increased morbidity.
- The city and society: congestion has the effect of increasing the time presence of vehicles on infrastructure; it is mechanically responsible for an origin portion of emissions so often criticized. Other critics point out that the plugs are with origin causing of the over consumption of the vehicles excessive vehicles. Moreover, in case of congestion, a large number of vehicles being concentrated in the same point have as a consequence the crossing of the thresholds which the effects of pollution are particularly harmful. However, that affects mainly the motorists themselves.

## **2 - Company Approach:**

The approach followed for the realization of this work involves the following steps:

### **2.1 Goal Setting**

The objective of this study is to establish a diagnosis on congestion and its impact in terms of noise pollution in the city of Batna. The study will also determine the modalities of management of these impacts and actions to take sufficient account of the environment through the integration of the concepts of sustainable development in the town of Batna. This study was committed to identify the most affected places by the congestion, it related to on seven intersections and crossroads.

### **2.2 Work tools:**

To achieve the aims "objectives" of the study we proceeded by:

- A) Quantitative measures (counting vehicles, noise measurement)
- b) Taken of sights
- c) Investigations with motorists and pedestrians

## **3. The town of Batna and transport situation:**

The city of Batna is located about 1000m altitude, 400 km east of Algiers and 200km from the coast, The period of building the city of Batna is relatively recent, for against that of the region dates back far in history; The population passed rose from 55,000 in 1962 to around 400,000 inhabitants in 2007 The commune of Batna knew a very constant growth of its population, it records the greatest rate of urbanization of the wilaya (89, 4%), Inspection Report of the Environment (2005). It is characterized by a relatively organized urban fabric, represented by the downtown gathering the principal equipment, very heterogeneous peripheral fabric, characterized by Housing collective, individual illicit constructions These operations resulted in the excessive consumption of space, the precariousness of the districts, the difficulties of movement and network management, the environmental degradation and framework of life, Document Town and country planning (2004).

The urban road network is 94 km, Boubakour (2004); it can be described according to its configuration on:

- Network circumvention.
- Exchange Network penetrating.
- Network of road service of the city center
- Network of local road service of the districts.

The town of Batna is currently a great center of travel, affected by inflows and outflows, causing the weakening of mobility and sometimes congestion particularly at peak times. Furthermore, these effects are accentuated by correspondence which takes place largely in the city center, generating important useless displacements, caused by drawdown coming from the periphery of the city.

This is mainly due to the radial structure of the network that is not conducive to the attenuation of the effects previously mentioned. Following this analysis, we note that the effects combined support the increase in the multiple nuisances effects (congestion, road insecurity, atmospheric pollution, noise pollution ...). In Batna, the car fleet is of 114241 at December 31, 2006 ONS (2006). A great number of vehicles are kind of diesel, fuel whose price is definitely lower than that of the other fuels and who generates an important pollution), in the same way for the vehicles with normal gasoline which are the main source of emission of lead.

## **4. Results and Analysis**

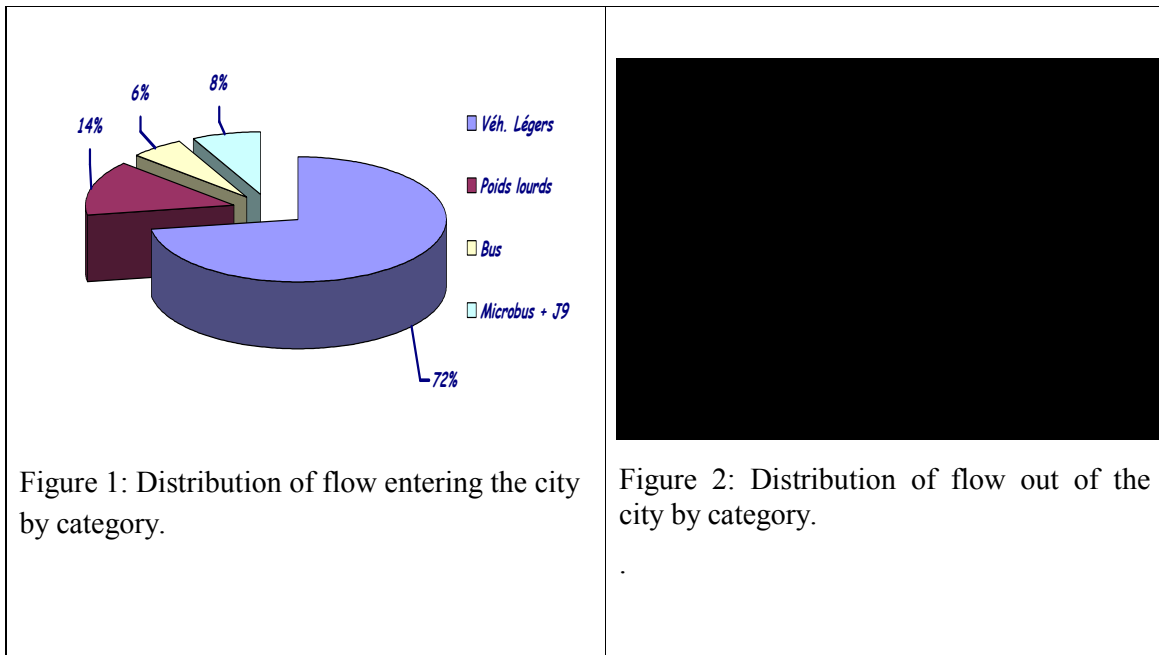
Places of road congestion in the roadway system in the agglomeration of Batna diversify in their evolution and become more and more complex in their causes.

As in all the cities, the center of Batna has some streets too strongly circulated, have regard with the width and the good state of the roadways, such as the road of Biskra (Avenue of the ANP-Avenue of Independence), Constantine Road (Avenue of the Republic), the road of Tazoult (Avenue of the Republic - Street Mohamed El Hadi Boukhrouf - Alley Mohamed Boudiaf), In addition to that, zones of congestion appear as examples on the following ways:

- Alleys Salah Nezzar, particularly with the transversal coming from the mosque of 1 November, leading to Bouakal;
- Street of June 19 – Abdesselem
- Houcine: leading to the University ;
- Street of Tazoult - street Hadj Abdelmadjid Abdessemed: going from Tazoult towards the industrial zone
- Alleys Menasria perpendicular to street Hadj Abdelmadjid Abdessemed as shown in the following map.

#### 4.1. Characteristics of the inbound traffic

Between 6:00 am: and 9:00: 4663 vehicles enter the city, including 3109 light vehicles, 607 heavy lorries trucks, 250 buses and 326 microbus and J9, as illustrated on figure 1. The figure below, gives a survey on the distribution of flow entering the city



This flow has the effect of increasing congestion in the city and more precisely at the crossroads studied because it is not too far from the northern entrance to the town of Batna.

#### 4.2 Characteristics of outbound traffic

Between 6:00 am and 9:00 am: 4291 vehicles leave the city, including 1996 light vehicles, 898 heavy Lorries, 160 buses and 284 microbus and J9, as illustrated on figure 2. Figure 2, gives a survey on the outgoing flow of the city.

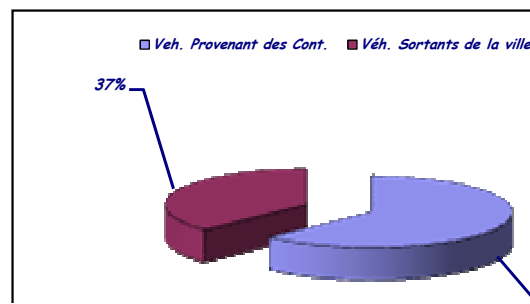


Figure 3: Distribution of flow out of the city.

Among the places which are affected by the congestion, the crossroads as example, we quote the crossroads El Hadj Lakhdar. Despite its important place in the city, it presents an almost congestion throughout the day because it is an obligatory passage for vehicles using the northern exit of the city and vehicles entering to the city. It constitutes a principal space in the city because of its proximity of the university, university residences, the courthouse, the urban and administrative centers.



Figure4: the crossroads of El Hadj Lakhdar.



Figure5 : Site of the crossroads.

This state puts moving thousands of people creating of the pendular migrations on long distances due to the imbalance which appears between educational equipment and places of residence a good part of the traffic (urban public transport (to the bus station), university transport (university residences and faculties). It constitutes a very important pedestrian circulation traffic., Dimensions of the crossroads El Hadj Lakhdar are indicated by following dimensions the external ray (Rg): 31.6 m; the interior ray (IH): 17 m; the width of ring: 8 m. This crossroads can be classified among major gyratory although it is in urban area.

To estimate the congestion at the crossroads, we affected a counting count of vehicles by category. The Counting was done in the time intervals corresponding to the rush hours following: 7: 00h -9: 00h, 11: 00h-13: 00h; 16: 00-18: 00h.

#### 4.4 Results

The results show that 16,600 vehicles pass each day this crossroads whose 7772 vehicles to exit the city. Light- vehicles represent for 90% Belamnaouer and Lagui (2007).

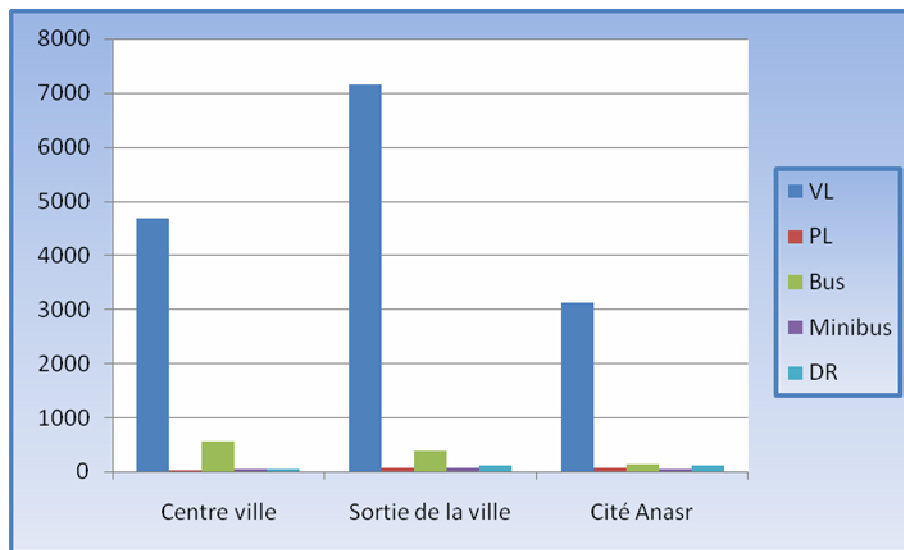


Figure7: Distribution by type of vehicles on each way.

The peaks are achieved on the intervals (11h-12h) and (16h: 30-18h), this corresponds to the exit time of the students. The congestion obeys at certain rates/rhythms and a certain layout (convergence the morning of the residential zones towards the places of employment and diffusion reverse the evening).

This crossroads constitutes also an obligatory passage for the buses of the urban transport and the buses of the university, which are parked anarchically on the four ways. For that, we carried out a counting of the buses and we timed the time of parking and stopping.



Figure 8-9: Anarchistic parking of the buses.

Figures 8 and 9 illustrate the parking near the crossroads of El Hadj Lakhdar, sometimes in second position. As example, on the way leading to the city centre, we recorded 222 buses public transport and 534 bus for university transport (de 7h à 18h) respectively with a time out of 455 seconds (time of passage with loading and unloading) and 6540 seconds (time of parking). We also noted that the buses using informal stops causing very serious problems.

From the observations on the site, we noticed that this crossroads constitutes also risk factors for the pedestrians who are related mainly to the crossings of the roadway.



Figure 10- 11: Pedestrians Crossing near the crossroads.

The absence of lawful devices which govern the activity of parking that made the appearance of informal parking. It should be stressed that in Batna, there are 249 abstract car parks Haftari and Sabor (2007), which are dispersed by chance (Randomly). This phenomenon can widen as long as there are not measurements of repression. This phenomenon generates the following effects:

Embarrassment circulation (economic factor and social)

Embarrassment to the visibility (factor of insecurity),

Embarrassment to accessibility (economic factor of a district)

Air pollution and congestion (factor of quality of life)

It should be noted that there is near the crossroads of El Hadj Lakhdar the informal parking of the taxis which accentuated the phenomenon of congestion.

In addition to atmospheric pollution, transports are also characterized by their noise nuisances, 80% of total noise caused by motor traffic and CERTU and ADEM (1999). The studies which we undertook in the city of Batna show that the majority of the city is exposed to this phenomenon. On the level of the crossroads of El Hadj Lakhdar, the threshold (65db) is largely exceeded during the rush hours, it reaches the 95 dB. It should be noted that the schools and the establishments of care are not safe from this phenomenon of the noise due to the motor vehicle traffic. A study carried out in 2005, us shows this:

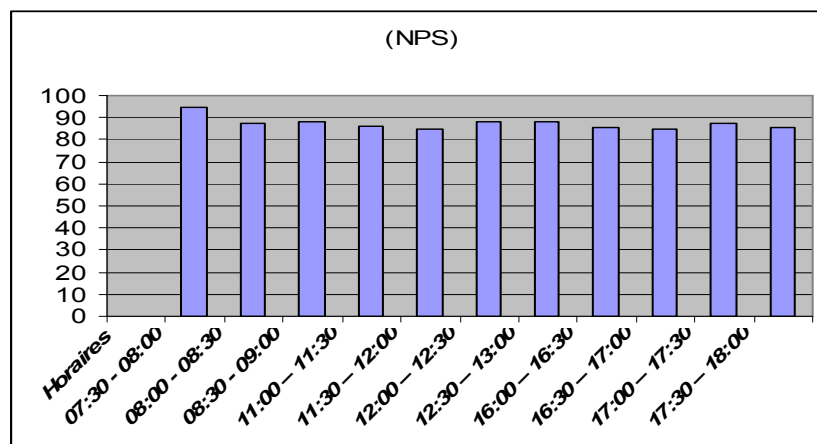


Figure 6: Noise levels in the crossroads of EL Hadj Lakhdar.



## Conclusion

The fast extension of the town of Batna has given the birth to new roadway systems and new crossroads. This extension combines new data with demographic, socioeconomic and guidelines governing the organization of transport that require revision.

With an aim of maintaining a balance between the density of the motor vehicle traffic and the road network capacity, we propose measures that can be grouped into the following categories:

1. Traffic Management: under this category are gathered the strategies, others that the construction of important road infrastructures, which are likely to influence the transport capacity (optimization of the existing infrastructures).
2. Improvement of the capacity and the level of service because some axes of the network from the city of Batna which knew these last years a saturation, particularly at the rush hours. It acts primarily the axes leading to central university, hospital and old bus station etc..., this overload of the network finds its origin in the growth of the number of vehicles and in state of degradation of the roadway of some axes of the road network in particularly the peripheral districts (Bouzourane, Park with Fodder, Bouakal, Kechida...). Furthermore, according to the observations made during the study, it appears that even the maintenance of the roadway is very bad quality
3. Designing a new traffic plan specific to the city for better care of the problem of congestion; This plan must encourage the choice of public transport with the best management of travel and in particular between the principal peripheral districts what would decrease the traffic in the city centre. and another part, the cover of maximum of zones, which would encourage the citizens to move by using public transport
4. Within sight of the anarchistic parking which reigns in the city of Batna, its organization must result in defining a level of individual accessibility in the city centre which is compatible with the respect for a good environment. Also, we must encourage the short-term parking that allows you to use more rational and economic space. Also, it is necessary to support the parking of short duration which allows a more rational and economic use of space.
5. Installation of traffic lights to enable a fluidity flow of traffic, marked horizontal a horizontal marking is necessary to the levels of the various studied places.
6. A clear and sufficient indication must be placed at the crossroads.
7. Noise pollution: Regarding the noise results obtained show that the major of the city is classified as a black dot spot. To improve the quality of life and ensure the comfort of citizens with respect to noise pollutions of land transport, It would be important to :
  - make a study pushed in this field to determine adequate technical, economic and legal tools to reduce noise;
  - To launch, in the short term a public awareness campaign of the general population to this danger;
  - Apply the new laws that require the reduction of noise in the new town planning ;
  - To refit restructuring certain parts of the roadway system and certain parts of the road infrastructures according to the national standards.
  - For the crossroads, we propose the refitting of the central small island of the crossroads.
  - Orientation of transport of the university bus towards other parking spaces so that they do not produce embarrassment at the crossroads.
  - Do not allow informal taxis to park

- Do not allow parking on sidewalks the pavements.
- Achieving an underground pedestrian passage.

## Thanks

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## Références

- [1] CERTU, ADEM, « Taking into account air pollution, noise and consumption of energy», France 1999.
- [2] Document Town and country planning, «cities in the revitalization of spaces, High plateaus », 2004.
- [3] F. Boubakour, « From regulation to re-regulation in transport», ENATT a Study Day, 14 December, 2004.
- [4] Group pollution by transport, Inspection Report of the Environment « Diagnosis of risk areas in the town of Batna», in June, 2005.
- [5] J. Pierre Nicolas «Course Transport and Environment ENTPE, Laboratory of Economics of Transport » 2003/2004
- [6] N. Haftari, S. Sabor, supervised by F. Boubakour «sufficient parking and parking Savages phenomena», A Memory graduation for graduation Principal Inspector of land transport, ENATT, July, 2007.
- [7] N. Guehtar, « Network and congestion in the town of Batna ", Day studies ENATT, December 14, 2004.
- [8] National office of Statistics (ONS), 2006.
- [9] S. Belamnaouer, H. Lagui, supervised by D. Seghirou "The nuisance caused by urban transport" Memory End of study for graduation Inspector of land transport, ENATT, July, 2007.