

BETWEEN URBAN DEVELOPMENT AND FRAGMENTATION: MOBILITY INFRASTRUCTURES IN THE METROPOLITAN AREA OF SANTA FE, ARGENTINA

Jaquelina Paola Santiago

Facultad de Arquitectura, Diseño y Urbanismo, Universidad Nacional del Litoral, Santa Fe, Argentina
jaquelinasantiago.arq@gmail.com

ABSTRACT. This research is a theoretical analysis of how transport infrastructures affect processes and socio-spatial dynamics of the city and territory. The research takes the Santa Fe - Paraná Metropolitan Region in Argentina as study area. Then it focuses on two specific road projects. This paper supports the hypothesis that the development of infrastructure of metropolitan mobility that is embedded in a process of urban expansion, positively are as connective elements that favor the development of social and economic processes, but simultaneously, if designed under the primacy of functionalist premise can generate as counterpart social-spatial segregation.

© 2016 SUPCD. All rights reserved.

Keywords: mobility infrastructures, urban fragmentation, metropolitan areas

INTRODUCTION

The overall approach of this paper emerges from the theoretical analysis about how transport infrastructure influences the social-space processes and dynamics of the City and the territory. The analysis derives from the focus on urban discipline which is interested in urban events and in this specific case, emphasizes the way of transportation of people within the metropolitan territory. This research focuses in the observation of two specific infrastructure projects of mobility. However it is important to highlight that these projects are included in a bigger area which will be presented herein. Such area is known as the Santa Fe-Parana Metropolitan Area (from now AMSF-P)¹ which according to the figures of the People's Census in 2010[1], bears more than a million inhabitants. In view of this situation, the Urban Observatory [2] has a deeper view on the condition of the area. On the other hand, this is a very valuable area in economic and transportation terms in the Argentine territory, comprised in a central strategic point with respect to the Central Bioceanic Passage and the Paraguay-Parana waterway.

The aim of this work is to carry out a theoretical -conceptual research of two theoretical values: mobility infrastructures and urban fragmentation, to carry out the reading of the AMSF-P metropolitan territory afterwards. As a particular aim, we propose the selection of two specific cases of infrastructures, where the relations among the theoretical variables are questioned. As a working hypothesis, we consider that development of metropolitan mobility infrastructures, which are inserted into a

process of urban expansion, constitute themselves positively as connective elements which improve the development of social and economic processes. At the same time, if these facilities are thought for the functionalist objective as a response to circulation speed, social-space segregation may be generated.

The analysis of transportation and its infrastructure is intended as elements which can put into value and trigger certain territorial conditions within an urban and territorial context. Many of the metropolitan and mobility or transportation infrastructures are also recognized as mainly designed for car traffic. This works as an element of fragmentation among cities as well as social exclusion.

LITERATURE REVIEW

Urban fragmentation

The term fragmentation in the urban context is not new. Fragmentation is inherent to the historical process of urban conformation and is an attribute of the city which has always been characterized by the heterogeneous use of the territory according to the social and technical division of work.

When Lobato Correa [3] defines urban space, he acknowledges that fragments keep a link given by the relation flows (special relations) which can be visible (people and goods circulation, etc.) or invisible (financial, informational, decision making, etc.). In such sense, urban space is simultaneously fragmented or divided and articulated: each part keeps a space relation with the others.

However, the term fragmentation possesses such a strong polysemic load that at present it is interpreted or understood from the global changes produced in the last decades, which give them characteristic features. On dealing with the question of urban fragmentation, we

¹ Santa Fe is the capital city of Santa Fe province, and Parana is the capital city of Entre Rios province. The cities are separated by the Parana River and connected by an underwater tunnel.

can mainly recognize two lines of analysis: a) on the one hand, the line linked to social inequality processes and material and/or immaterial barriers, and b) on the other, the line which has a relation with the discontinuities in the process of urban expansion with respect to the point product of the metropolization processes.

Castells [4] defines urban segregation as the tendency to organize space in areas of high social internal homogeneity and strong social disparity. This difference may be understood not only in terms of dissimilarity but also of hierarchy. In this sense, social stratification also creates space stratification which can be seen in urban segregated areas, also occupied by social groups similar to those who live in the same morphological surroundings [5]. In sociologic terms, segregation means the absence of interaction among social groups. In geographical terms, it is an inequity in the distribution of social groups within the physical space. The presence of one type of segregation does not ensure the other's existence. [6]

The contemporary city is recognized as being in a process of social segmentation, which is a term used as the process of reduction of opportunities, of group interaction or different social categories. In static terms, a segmented society is one where there is quite a low interaction outside the working market among groups of different socioeconomic strata. [7]

The space of flows and the prospect of networks

Our society is built keeping in mind its flows, which are not only social organization elements but also constitute the "expression of the processes leading our economic, political and symbolic life". Flow space dominating and making up the network society, is therefore the material organization of social practices in shared time which work through flows. [8]

From the geographical setting, Blanco [9] addresses the relation networks-territory, linking it especially to the acceleration of different ways of circulation (goods and people, information, ideas, images, capitals) which characterize contemporaneity. The mainstreaming of networks foregrounds the relations and the flows that connect different subjects, actors and territories forming an articulated joint.

As a network characterization, the author uses two definitions elaborated by other authors: [10] * The idea that at least three dimensions can be distinguished in the networks: infrastructure, which deals with the set of material elements permitting the relationship to be built, flows, which redesign networks in the effective use of infra-structure, and info-structure, which designs the regulatory net which makes networks function.

* The presence in the networks of two articulated components: a formal architecture (material components) and social organization, which highlights the characteristics that adopt these material components are not intelligible without reveal who are the actors who make and command that network.

Territorial mobility

From a social point of view, Gutiérrez [11] argues that mobility is a performance within the territory and this is understood as a social space where history and conflict prevail, differing from the traditional approach of transportation as a natural, physical, geometric and measurable means, support and containment setting.

Territorial mobility is part of the social capital of people, and together with health, housing and education make up the basic conditions of social inclusion. Such inclusion is associated with the integration of individuals whose existence in a society is a contingency due to the minimal choice capacity to satisfy production and reproduction needs in their lives. [12] This is social integration by expanding the structure of opportunities, including satisfying mobility requirements.

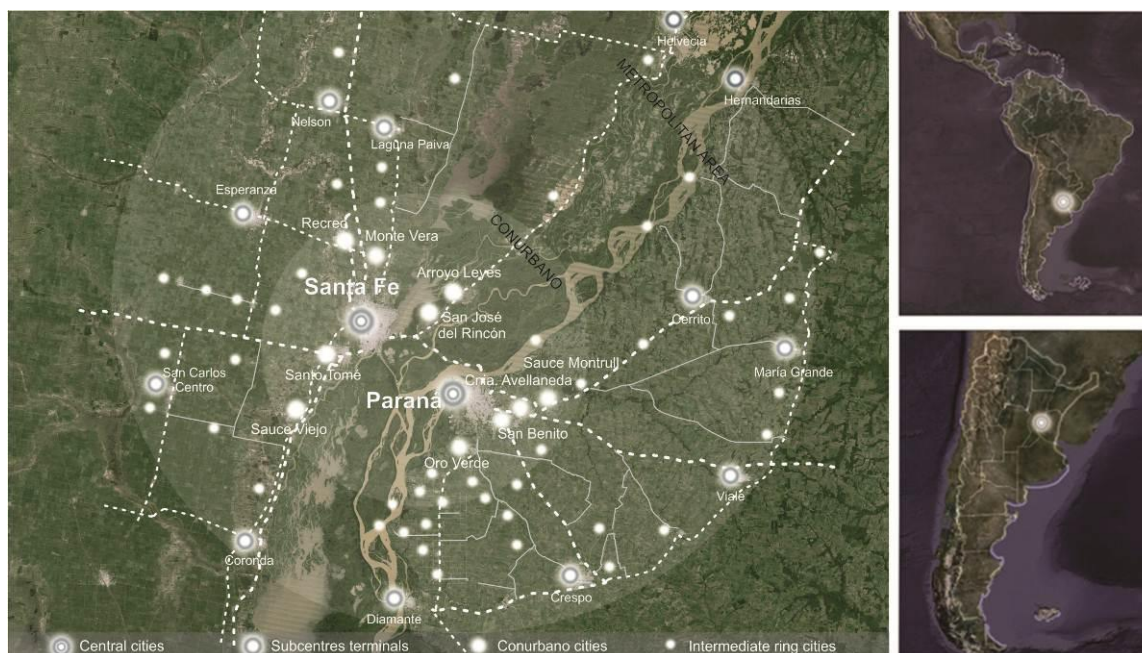
In this point we wish to clarify that mobility is one of the aspects which influence city complexity and we understand that this is not the only reason for the changing processes. Nevertheless we highlight that the influence of transportation infrastructures is such within the dynamics of urban processes, that they will be considered as a structure axe or line for the present analysis.

Mobility infrastructures

Transport infrastructures are technological elements in the city and as such, are limits and a containment of different areas and their means of transport: the city and its metropolitan area are constructed and structured through infrastructure networks in such a way that these alter the geography of a place; roads are the penetration rupture axes of friction which the space itself opposes to movement. [13]

Dynamics of Santa Fe-Paraná metropolitan área

It is described as an urban-rural setting, which has the peculiarity of "doubling" its central city into two urban spots: Paraná and Santa Fe (central cities), each one of these with their locations agglutinated around (conurbano cities), borderline cities to the defined scheme (subcentres terminals) and several small locations in the inner ring between the agglutination and these terminal cities (intermediate ring cities) [14]



Source: Soijet M., Gramaglia V., Santiago J., Garcia V.; Google Earth satellite image 2014
 Figure 1: Scales approach to the Santa Fe-Paraná Metropolitan Area.

It is possible to refer to the system as a complex one as long as some of its components gain “leadership” in the general scheme for different reasons; long term cultural traits of value of the metropolitan surroundings – more and more distant- as a living space, some improvements or connectivity qualification, which work as a possibility of pendular displacements generated by the housing-work displacement and the “population attractant” profile of certain nuclei by their specificity linked to an activity.

There exists an area which belongs to central cities and their corresponding agglutinations with a high concentration of activities. Up to the now, this area has absorbed the growth of the former – Santa Fe and Paraná – showing a relative balance in this first circle of cities, mainly observed in Santa Fe.

From 2010, it can be seen that the centrifuge decentralization of residences has reached the second circle; small locations of the intermediate ring which according to their growth, are highlighted in the metropolitan map. The rest of the locations within the intermediate ring show a wide variety of situations in which it can be observed a near “disappearance” of other, encouraged by the intention of using the conditions of an optimal place to live. [14]

These processes lead to serious consumption situations of the productive soil for urban use. Such conditions are being studied at present. Problems like these; the ones caused by

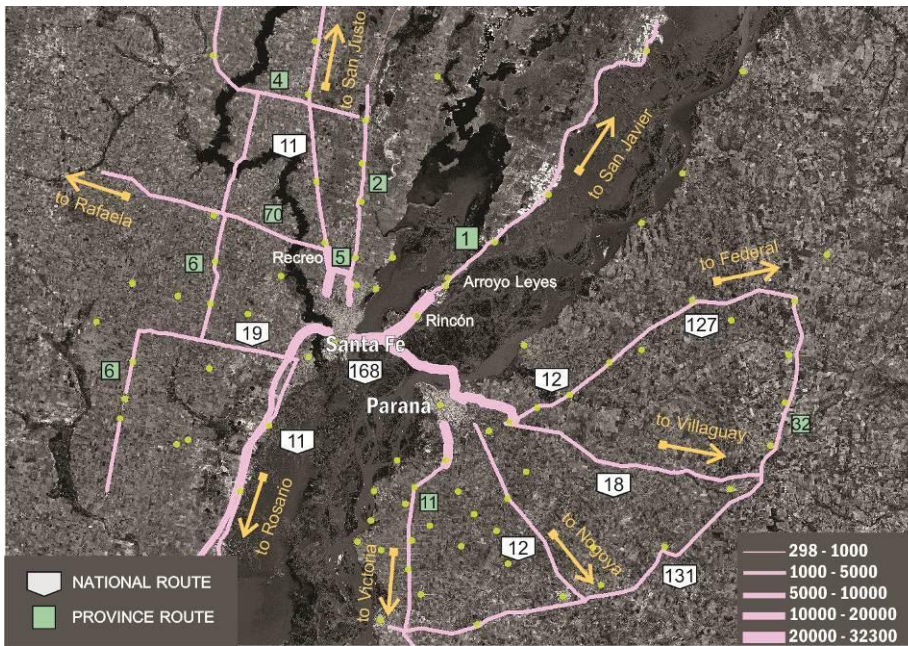
mobility, the need to carry out an efficient and thorough management of risk, the preservation of particular environments of high ecology value, among others, show the need for creating links and highlight the potential relation of this regional setting

RESEARCH FOCUS

Mobility infrastructure in Santa Fe-Paraná metropolitan area

The AMSF-P does not remain out of the specialization processes of spaces fostered by modern planning. Thus, housing, working, recreational and circulation spaces were specialized within gradual processes of city growth. The evolution of a contemporary metropolis is influenced by a complex set of forces which modify the consolidated city whereas they direct the creation of new spaces in the periphery. [15] The metropolis spread as a possibility of covering long distances in the everyday displacements and increasing housing spaces.

The periphery growth shown in the area under study constitutes a metropolitan territory which is the result of an expansion process where population and activities which don't fit in consolidated urban and dense central parts of the city are redistributed. Interstitial spaces of a very low density are created: spots, pieces, textures are spread among empty spaces where the pieces show a changing and diffuse pattern which offers itself as a set. [16]

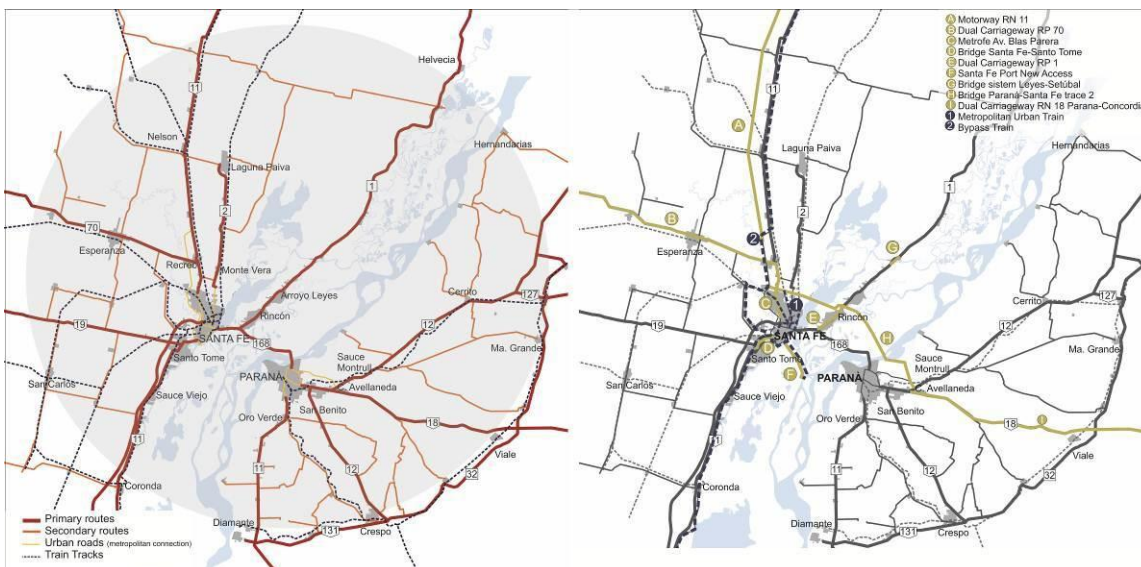


Source: Soijet M., Gramaglia V., Santiago J., Garcia V.; Official data of national and provincial Roads Authority, 2014.
 Figure 2: Annual average daily traffic (TDMA) in the AMSF-P.

Provincial Route N°1 (RP 1) in Santa Fe shows high values of Annual Average Daily Traffic (referred to as TDMA) which amounts to 20.600 vehicles crossing the cities of the agglutinations and then decreasing considerably. [17] This situation is related to the increase of the interactions by the extension of permanent residential weekend use in Santa Fe into that route. Other significant value can be observed in National Route N° 11 (RN 11) between Santa Fe and Provincial Route N°70, with a figure of 13.400 vehicles. [18] This is related to daily movements for working and study reasons which are present in Santa Fe, Recreo and Esperanza.

Generally speaking, the level of TDMA in most of the routes decreases as they leave the central cities. This reinforces the condition of centrality of Santa Fe and Parana, even though the recorded values in the motorway which joins Santa Fe and Rosario show a relation with this city which was not considered herein.

Finally, the higher level of TDMA is recorded in National Route N° 168 in the section connecting both central cities, and the figures rise up to 32.300 between the Santa Fe exit and Provincial Route N°1. [18]



Source: Santiago J.; 2016.
 Figure 3: Left: Map of road and rail infrastructure existing in the AMSF-P.
 Right: Map of road and rail infrastructure projected in the AMSF-P.

As it can be observed in the left graph, the road plan or scheme shows in the first place, a differentiation in their macro shape in each Province. Clearly Entre Ríos is identified with the radio concentricity whereas Santa Fe shows a network. This means that the performance "respects" such forced configuration by the presence of the Salado River.

As for Santa Fe, it should be pointed that the railway is not used for passengers and it is hardly used for goods transportation. That is to say this high connectivity level shows the railway layout that the region once had and which triggered the creation of many locations, but is now lost. As for Entre Ríos, we highlight the presence of National Route N° 131 and Provincial Route N° 32 which connect terminal cities, with no need to go across the central city of Paraná, which is different to the situation in Santa Fe.

Taking into consideration the railway projects in the area (right graph); there are many of them especially in Santa Fe province. This is the result of the growth of the region in the national context. Nevertheless, these projects have been intended for as long as 20 years, as is the case of the new bridge which joins Santa Fe-Santo Tome and the new Santa Fe-Paraná connection.

The case of the new dual carriageway² in Provincial Route N°1 (R.P. N°1)

The passage in this route is the most meaningful case of urban expansion in Santa Fe city. It includes La Guardia and Colastine (within the area of influence of Santa Fe) and then San Jose del Rincon in the first ring and Arroyo Leyes (20 km from the central city) in the second ring of the metropolis physical expansion.

In absolute terms, from 2001 to 2010 Rincón has grown considerable to such an extent that its population grew to more than 10.000 inhabitants, therefore it has been transformed into a city; Arroyo Leyes in the second ring has grown in relative terms, the 35% of its population increasing in this period. [1]

Traffic jams demographic growth has caused between these towns and Santa Fe has rendered it necessary to think in the development of a dual carriageway.

As regards figures, we may say that about 15.000 cars as an average, ride in Cero Kilometer. On Sundays, this figure rises up to 20.000; 10.000 cars is the average number in

kilometer 4, near Colastiné 8.000 vehicles reach kilometer 6, which is the main access to Rincon. [18]

The section of the route to be turned into a dual carriageway is the section comprised between kilometer 0 -crossroads with National Route N°168- and kilometer 6,6, in the jurisdiction of San José del Rincón. The new dual carriageway will bear two tracks one for each sense, with a central elevated section, return circuits every 500 meters and traffic lights.

These locations of the agglutination have emerged around the route, which turned out to function as a sort of urban-commercial avenue gaining importance within the territory. The construction of the dual carriageway generates a bigger distance for the pedestrians and changes this urban setting in a limit which fragments or splits locations at both sides. It is important to point out that the dual carriageway design was strictly thought to counteract the traffic jams and improve circulation speed.

The Province management of this project has, however, had an approach with the Rincon town hall authorities. Due to such valuable interaction, two collector roads were added to the dual carriageway (one on each side) with a one-hand only run. Public transportation will make use of these all along the road. This improves the relation of pedestrians with the infrastructure and soothes their insertion in the urban environment.

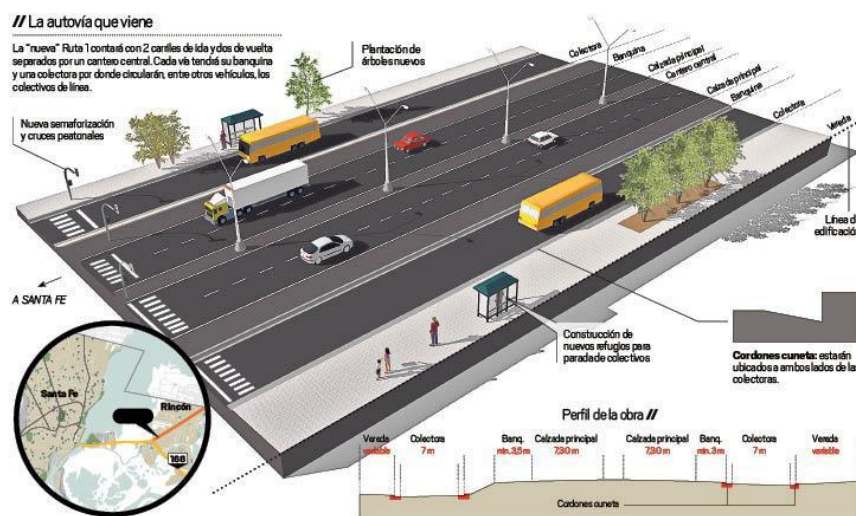
Nevertheless, this project was not conceived from an urban design point of view. As an example, it bears no areas for bike riding, an item which nowadays constitutes a sustainable way of transport in all cities. The traffic lights have a 500 hundred meters synchronization, which considered vehicle speed and left aside the importance of pedestrian crossings.

Nevertheless, the neighbours raised their claims to provincial authorities and municipalities (town halls) of Santa Fe and Rincon, demanding complementary works as a priority. Such works include: ditch tubing, route asphalt and the inclusion of roads for bike riding. [19]

² In this paper the dual carriage term is used to refer to the expressways with round rails separate and exclusive to cars as motorways. The difference is that these crosses are made in level and in Argentina are usually carried on roads that were constructed before.



Source: Santiago J.; Google Earth satellite image, 2016.
 Figure 4: Aerial image of R.P. N°1, section Colastine-Rincon.



Source: El Litoral journal; 2011.
 Figure 5: Perspective and section of the dual carriageway project with the addition of collector roads.

The case of a parallel motorway to National Route N° 11 (R.N. N°11)

The R.N. N°11 is of great importance in the nation. It connects Santa Fe, Chaco and Formosa provinces. Besides, it turns out to be essential since it runs north – south along all the santafesinian side.

In this point it is important to emphasize the conurbation area which generates between the cities of Santa Fe and Recreo. The latter keeps growing at a steady path mainly due to the overcrowding of Santa Fe. Nowadays, Recreo has more than 16,000 inhabitants [1] spread in the territory in two different ways. On the one hand, population settles in an urban

traditional plant which spreads itself as an oil stain phenomenon. On the other hand, there is a linear settlement along R.N. N° 11 which had its origins as an industrial settlement and is at present a mix between suburban housing and industries.

Along the Rosario Santa Fe section of this route, a parallel motorway absorbed the route traffic. To the west, a bypass road was built, which goes from Santa Fe to Recreo and acts as a defense to the Salado River at the same time. This has been quite positive to change truck traffic in both sites, especially in Santa Fe since this route leads to an important urban avenue: Blas Parera Avenue.



Source: Santiago J.; Google Earth satellite image, 2016.
Figure 6: Aerial image of R.N. N°11, section Santa Fe-Recreo.

At present, the need arises to build the way from Recreo to San Justo, an important city with more than 23.000 inhabitants [1] which is located approximately 100 km to the North of Santa Fe along this route.

The first attempt was to turn this route into a dual carriageway, a project similar to the one above. However, after several feasibility studies carried out by *Dirección Nacional de Vialidad* (roads authority), it was decided to construct a new motorway with controlled or monitored accesses, parallel to R.N. N°11.

This decision was justified by the amount of urban commutes, the adaptation of which could be more expensive than the building up of a new one. Most of the places in this route, show similar situations to Recreo: adjacent settlements on the route. Therefore, the decision of building up a new motorway in this case is appropriate not only in economic but also in urban terms since there will not be fragmentations in the urban areas since the cities are not in the way.



Source: Dirección Nacional de Vialidad; 2015.
Figure 7: Motorway Project trace R.N N°11 Santa Fe-San Justo.

This project has the aim of preventing urban commutes along San Justo and to prepare it in such a way that – which time – the motorway may be continued to the north of the country. An important piece of information is that access to towns will be included in the project. At the same time, improvements will be made for urban commutes of the existing route. Repaving, streets widening, roadside paving, will be carried out to improve the actual condition of R.N.º 11.

Though no great definitions as for the project have been presented yet, the decision of its implementation and the execution of complementary works are highly appreciated. These improvements will highly favour urban environments.

METHODOLOGY

Methodology is a mixed method, which comprises a complex and profound understanding of the relationship between mobility infrastructures and urban fragmentation by means of the historical reconstruction of this relationship, social and space conditions of a fragmented city and the perception of the main actors; the citizens who live in the city and move within its territory.

The viability of this research lies in bibliography review from direct and secondary sources from authors which deal with mobility issues, the attendance to specific seminars of PhD studies, the participation in Research Projects *Observatorio Urbanístico del AMSF-P* and the attendance to different Lectures and Seminars which render it possible to rely on methodologic and scientific tools.

On the other hand it is also of great importance for the development of research, inquiries in national government agencies (*Indec, Vialidad Nacional, Plan Estratégico Territorial, etc.*) provincial organisms (*Planes Estratégicos and Vialidad Provincial*), town halls (Urban Plans, Ordinances, statistical data, data base, etc) from local records of interventions already performed. These sources were also complemented by our own data base from previous studies (satellite images, in situ verifications).

RESULTS AND DISCUSSIONS

The aim of this paper is to show some of the features of the impacts produced by road infrastructures in peripheral areas of the first metropolitan ring. In this specific case, two cities of the santafesinian outskirts are examined: Rincón and Recreo. For both, we

observe different interphase country-city situations which are characterized by a recessing productive area and an expanding residential area.

These impacts can be observed within two poles : on the one hand, the fragmentation impact and the lack of insertion in the urban environment and on the other, the potential impact recognizing the project and proposal capacity as a strategy for urbanization, order and the meaning of low density territories.

When facing the above mentioned problem of urban fragmentation, there are two possible ways of addressing this issue:

- To avoid directly the layout of motorways crossing urban plants, surrounding the locations. This is the answer to the proposal of new motorway R.N. Nº11. For this case, special care should be taken as regards the accesses to every location, the crossings and other complementary works for the urban requalification of the existent roads, if it is necessary even though the new way is not settled in the territory where the other one already exists. It is of great need that the urban design or urban layout be implemented to give meaning to the road system, as long as such infrastructure works are carried out.
- For many cases, this first option is not possible, because a complex policy of expropriation is required since these operations may be too expensive or because fast speed roads are too consolidated. In cases as these, where it is impossible to prevent urban crossings with territorial infrastructures of speed, a road project should be carried out with a strong link with its insertion area. This means that technical design parameters should be adjusted and suited to the urban features of the territory where the new infrastructure will be located, so as to overcome functional conflicts, formal mismatches and environmental effects which could be generated.

There are also other more extreme cases where these structures can generate border situations when the urban factor is left aside. These are the viaducts which constitute real physical barriers deteriorating not only the economic value for the depreciation of territories but also losing patrimony and social value.

In order to illustrate the problematic situation the whole world is involved in, we herein provide an image of a national example: Buenos Aires, Argentina



Source: *Café de las Ciudades* Journal; nº 132, October 2013. http://www.cafedelasciudades.com.ar/movilidad_132.htm
Figure 8: Viaducts in downtown Buenos Aires, south of July 9 Avenue

In such cases, solutions must also be extreme. We must appeal to the demolition of such constructions as a way of reducing friction and proceed to the recovery of urban spaces. A very well-known and up-to-date example is the recent demolition of the surrounding viaduct of the Rio de Janeiro Seaport in Brazil, with the aim to recover the sea front for the Olympic Games 2016.

Finally, it is assumed that it is possible and convenient to rethink this type of road as urban roads and conceive them within the framework of integrated urban projects. Innocuous insertion of an infrastructure designed from a technical planning is necessary to consider the functional and formal logics of the city and in this way move ahead to the conception of having many important urban functions. This road may show a negative image because it has been demonstrated how it can generate urban fragmentation. However, this situation may be changed with urban planning and design. Therefore, such infrastructures could be used as tools to overcome certain connection and accessibility deficiencies.

CONCLUSION

Metropolitan mobility infrastructures show a potential for economic, social and urban development in the transformation of the first periphery of a central traditional city. Though these roads act as elements which can put into value and boost certain territorial conditions within an urban context, they may generate social-space segregation since they act as a border with no relation to its urban surrounding which causes fragmentation.

Such is the situation of Santa Fe city, with the two cases of study which were proposed for this research where in R.N. N°11 and mainly in R.P. N°1, people have been building settlements along these roads, spreading the urban tissue as a consequence of the central city overgrowth.

For the specific case of R.P. N°1, we may speak of a consolidation process of a

residential layout which at its very beginning rose as a settlement of weekend houses but nowadays and with the help of private vehicles; most of them are permanent residences.

For the case of R.N. N°11, a residential suburban overgrowth from Santa Fe city can be seen, spreading towards Recreo and mixing with industrial settlements.

We claim that the introduction of metropolitan mobility infrastructure, which crosses urban territory, must not be justified only in the need of allowing high speed transportation, but also in the search of a more rational use of the ground and a more efficient organization among the different kinds of transportation. In this way it will be possible to give simultaneous solutions to connection and distribution needs, changing the formal solution in an articulation element and urban formalization.

ACKNOWLEDGEMENTS

To the Project CAI+D 2011 (Course of Action in Research and Development) in which I participated: "Observatorio Urbanístico del Área Metropolitana Santa Fe-Paraná", Dr. Mg. Arq. Mirta Soijet director.

To the Universidad Nacional del Litoral which granted me the PhD fellowship in which this paper is framed.

REFERENCES

- [1] Censo Nacional de Población, Hogares y Viviendas, INDEC, 2001 y 2010.
- [2] Proyecto CAID (2011) "Observatorio Urbanístico del Área Metropolitana Santa Fe-Paraná: Sistema de Información para la generación de nuevos conocimientos técnicos con aplicación a las problemáticas urbano-territoriales del área", Facultad de Arquitectura, Diseño y Urbanismo, Universidad Nacional del Litoral, Santa Fe, Argentina.
- [3] Lobato Correa, R. *O espaço urbano*. Sao Paulo, Ed. Atica; 1989.
- [4] Castells, M. *La cuestión urbana*. España, 15rd Ed. Siglo XXI; 1999.

- [5] Estébanez, J. Los espacios urbanos. In Puyol, R et al, Ed Cátedra, *Geografía Humana*, Madrid, 1992, p. 574.
- [6] Rodríguez Vignoli, J. Segregación residencial socioeconómica: ¿Qué es?, ¿Cómo se mide?, ¿Qué está pasando?, ¿Importa? In CEPAL/ECLAC Naciones Unidas, *Serie Población y Desarrollo*, (LC/L. 1576-P), Santiago de Chile, 2001, p.11.
- [7] Kaztman, R. Seducidos y abandonados: el aislamiento social de los pobres urbanos In *Revista de la CEPAL*, No. 75, 2001, p. 171-189.
- [8] Castells, M. Cap. 5. El Espacio de los Flujos. In *La Era de la Información. Vol. 1: La Sociedad Red*, Alianza Edit., Madrid, 1998.
- [9] Blanco, J. Redes y territorio: articulaciones y tensiones. Ponencia presentada en el XII Encuentro de Geógrafos de América Latina, Montevideo, Uruguay, 2009.
- [10] Santos M. *A natureza do espaço. Técnica e tempo, razão e emoção*. São Paulo: Ed. Hucitec, 1996.
- [11] Gutiérrez, A. Transporte público y exclusión social. Reflexiones para una discusión en Latinoamérica tras la década del '90. In: XIII Congreso Latinoamericano de Transporte Público y Urbano, CIDATT - Centro de Investigación y de Asesoría del Transporte, Lima, Perú, 2005.
- [12] Castels R. *Las metamorfosis de la cuestión social*. Buenos Aires: Ed. Paidós, 1997.
- [13] Herce Vallejo, M. *Sobre la Movilidad en la ciudad, propuestas para recuperar un derecho ciudadano*. Barcelona: Editorial Reverté, 2009.
- [14] Soijet, M. y otros. Santa Fe-Paraná en el inicio de la consolidación metropolitana. En *Observatorio Urbanístico Área Metropolitana Santa Fe-Paraná* N° 07, julio 2015, Santa Fe: ed. FADU-UNL. p. 5-16.
- [15] Hall, P. Forces shaping urban Europe. In *Urban Studies*, Volume 30, Issue 6, 1993, p. 883-898.
- [16] Arias Sierra, P. *Periferias y nueva ciudad. El problema del paisaje en los procesos de dispersión urbana*. Universidad de Sevilla, 2003.
- [17] Dirección Provincial de Vialidad de Santa Fe.
- [18] Dirección Nacional de Vialidad.
- [19] Diario El Litoral, 06-08-2011. Available in: <http://www.ellitoral.com/index.php/diarios/2011/08/06/metropolitanas/AREA-05.html>