

RISK ANALYSIS IN URBAN TRANSPORT SYSTEMS: EVALUATION OF THE OCCURRENCE OF CRIMINAL POSSIBILITIES IN RAPID TRANSIT BUS OF SÃO JOSÉ DOS CAMPOS

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Abstract: - This article aims to prioritize preventive actions in the transport called Bus Rapid Transit (BRT), in order to anticipate, prevent and respond effectively to events using descriptive statistics, through real and quantitative data occurrences, approved by responsible public sector thus identifying which crimes occur more frequently, making it possible to attack and suppress factors that favor such threats, also addressed the crime of terrorism and the possibility of adequate response to the situation with employment of response against forces available in the area and vicinity, focusing in time compression, crucial factor in the solution of the crisis.

Key-Words: - Mobility, Security, Crime, Threats, Risk

1 Introduction

This article aims to demonstrate the importance of setting up a risk analysis in operational public safety in the transport modality called Bus Rapid Transit (BRT).

The growing demand for investments in urban mobility also underlines the need to offer comfort and security users. The means of public transport that gives good results is currently (BRT), which offers comfort and technology, the cost of implementing this form of public transport is compatible with the cities of medium and large budget, making this model an interesting alternative choice as CL Mars, L.R. Yoshioka, J.E.L. Medeiros, L. Peron [1].

Cities around the world use the BRT concept as the backbone for public policies of urban development. In Brazil, the state of Paraná is a

pioneer in the implementation of BRT, serving as a basis for other states of the federation as: Belo Horizonte, Brasília, Fortaleza, Goiânia, Porto Alegre, Recife, Rio de Janeiro, Uberlândia, this modal received good acceptance by the users, reflecting positively in traffic due to its independent corridors as SPV M. White is kindly refer [2].

The knowledge and information of the experiments carried out in different cities is crucial, therefore, from the practical realization of the theoretical concepts by which the system is based, it is possible to identify the limitations to subsequently correct them, thus walking in the improvement of sense of the system. With support and funding from the National Development Bank (BNDES), BRT was implemented even in other countries, subject treated by D.Q.G. Ferreira [3].

From the successful experience in the first phase

of the Transmilenio in Bogotá in Colombia in 2000, BNDES has systematically structuring operations for BRT systems in Latin America and Africa. In addition to Colombia, BNDES supported the BRT systems in Chile and South Africa and is still in its portfolio of potential financing projects in countries such as Angola, El Salvador, Guatemala and Peru. [3] Continues to increase the number of countries that have adopted this model, which is constantly evolving and technology implementation, following this trend modal success as C.L. Mars, L.R. Yoshioka, J.E.L. Medeiros, L. Peron [1].

For BRT reach the highest levels of efficiency (lower cost and higher reliability), safety and comfort, the use of advances in information technology and communication is key (ICT) and the BRT is a concept that shows, clearly, the development of transport services with the combined application of Intelligent transportation Systems technologies (ITS).

Accompanying this progress is necessary to prioritize the safety of users, public transport of large cities, violence has reached alarming numbers, in addition to crimes considered relatively simple as robbery, theft, assault, extortion, embezzlement, illegal trade, sudden cardiac arrest victims, support for pregnant women, stroke victims stroke, other criminal acts such as rape, trampling involving cyclist, pedestrian involving trampling, collision with other vehicles at intersections, and personal injury with use of perforating gun in order to infect people, not it is feasible to discard the possibility of a special kind of occurrences, terrorist type act, fire BRT vehicle, victim retention and need for emergency evacuation [8].

In urban mobility implementation of safety standards procedures, targeted to meet small and medium-impact events, will reflect on the whole system, reducing the risks and losses involved in these operations, when these procedures can not prevent occurrences, this reflects negatively on all operation of the system, causing many losses and generate feeling of inefficiency users, a simple medical care can generate significant impact on the entire system.

An appropriate methodology, aims to prevent some instances, to achieve success in security activity, requiring the involvement of several public and private sectors, geared to good operation of the transport system in the premises and surroundings. At the time of occurrence is necessary the presence of qualified professionals from various specialties, such as private security (monitoring through CCTV system); ready first aid; Customer Service (SAC); and other activities, getting the public officials of the

municipal civil guard responsibility for monitoring through CCTV system, working in effective traffic enforcement.

Performing ready municipal first aid is usually made by appropriate public officials, the state civil police engaged in the research and preparation of police reports and other judicial police activities. Military Police operates in ostensible policing and necessary interventions, military or civilian fire brigade, military air support, specialized police in crisis management, specialized military police in occurrence with explosive, specialized policing control civil unrest, these forms of police action when oriented service are coordinated by appropriate technical channel, increasing the chances of success in this direction Son argues that [4].

In this context, proposing the use of agile methodology for creating and sharing knowledge in a central emergency military police, which become more agile flow of information for the provision of services, it becomes relevant.

A major threat plaguing the world today, constantly terrorist activities are taking place in various parts of the world and especially in big cities like London, Paris, New York and Berlin [5], which can not be overlooked. The destructive methodology of these groups does not obey the rules or parameters, however, this objective occurrence of typicality reach the greatest number of people, such as more unprepared and unprotected best for the commission of the offense, according to Costa. [5]

The attacks of September 11, 2001 in the United States, attributed to al Qaeda, have achieved at the same time precise objectives (military, economic and political) without distancing himself from one of the main characteristics of terrorism, attacks against indiscriminate targets and against victims innocent.

The use of methods and raw materials for terrorist crime practice, unfortunately find it difficult to break through the borders of Brazil, this mainly due to its continental size and borders easily accessible, according to Costa the performance of "transactional terrorism" has no territory nor respect national borders, too, does not respect the international conventions that meet and limit their power. [5]

No distances to terrorism in a globalized environment in which we live today, where technological processes advance an unimaginable speed, particularly in the media, and the means of ever faster transport.

The Brazil has large step towards responding to terrorist threats with the enactment of Federal Law No. 13,260 of March 16, 2016, disciplining terrorism, dealing with investigative and procedural provisions and reformulating the concept of a terrorist

organization.

At this time Brazil is favorably positioned to adopt counter-terrorism measures, meeting of the United Nations interests and signatory countries, very pertinent issue being defended by Barbosa, [6].

The framework of terrorism as unacceptable act and combating the conditions that favor the emergence of terrorism should be the basis of the shares according to the UN to dissuade people from supporting or use up that environment [6].

First, States and civil society must make clear that terrorism, even those with nationalist claims, can not be justified. In this sense the public transport also received special attention, become constitutional law. Therefore, this work focuses on the threats and risks in the use of BRT system in São José dos Campos.

2 The Bus Rapid Transit (BRT) in São José dos Campos

The purpose of this article is to demonstrate that basic issues of public and private social (crime), directly impact on modal (BRT), in São José dos Campos, a city located in the state of São Paulo, which is in the final phase studies feasibility for implementation of (BRT), with planned extension of 51.2 km, 61 stops, six transfer stations and 2 terminals (figure 1).

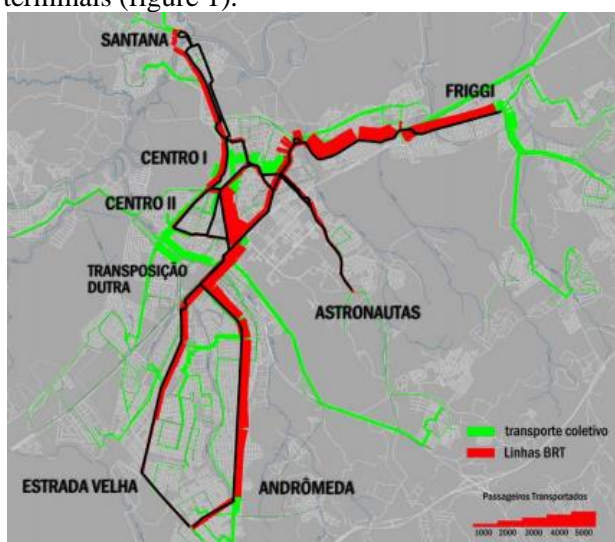


Fig.1 Stations and Terminals BRT S.J.C

The BRT project for the city of São José dos Campos will be contemplated with advanced technological system, the result of research and development itself of the system, functional design, has been prepared for this purpose, consisting in BRT Functional Design of São José dos Campos [7].

To meet comprehensively the local society, as

stated in BRT Functional Design [7], the project of São José dos Campos seeks to integrate the mobility of non-motorized modes, is planned to build bike path along the corridors, with the exception of where it does not have physical space, and improving pedestrian infrastructure, such as adequacy of sidewalks, raised crossings, proper signage and ramp access to the terminals and stations. This, in turn, promote frank improvement of urban traffic circulation and reducing emissions promoted by private vehicles, therefore bringing security and comfort (Figure 2).



Fig.2 Bus articulated 4 door, in use S.J.C

The city already has quite wide transport system, however, one of the project goals is to raise the level of comfort and include the public transport more modern technologies, as contained in Functional Design [7].

The BRT system São José dos Campos will allow average speed of 22 km / h and its tariff will be charged prior to shipment, which ensures shorter waiting time of vehicles in the stations in a safe and comfortable way.

The travel times from the terminals, as well as the operation of supervision of services and management of corridors will be the Municipal responsibility of the City of Transport São José dos Campos.

2 Study of Urban Crime in Sao Jose dos Campos

The methodology of this study was the quantitative analysis applied mesurando actual number of occurrences of a given period, between 2014-2016, with particular attention to the 2015 data, the information including the number of public transport users in the city of São José dos Campos They were obtained from the city.

Information on the amounts of criminal occurrences were obtained in the Public Security

Secretariat of São Paulo (SSP-SP), from approved numbers with publication in the Official Gazette, as recommended by the Public Safety Department of the State of São Paulo SSP-SP [8].

The crime statistics are used to portray the situation of public security and allow the planning of police actions and investments in the sector. In São Paulo, the compilation of data is done by the SSP-SP, through the Coordination of Analysis and Planning (CAP) - responsible for analyzing the data of police interest and studies to prevent and combat crime. These are available to the general public, the Public Security Bureau of the State of São Paulo. [8]

The collection of crime data across the state of São Paulo [8] standardizes and organizes the flow of occurrences numbers collected from the police, from criminal occurrences records. Its content helps monitor the changing trends of the main indicators of criminal period as well as in decision-making within the State and the police (Figure 1).

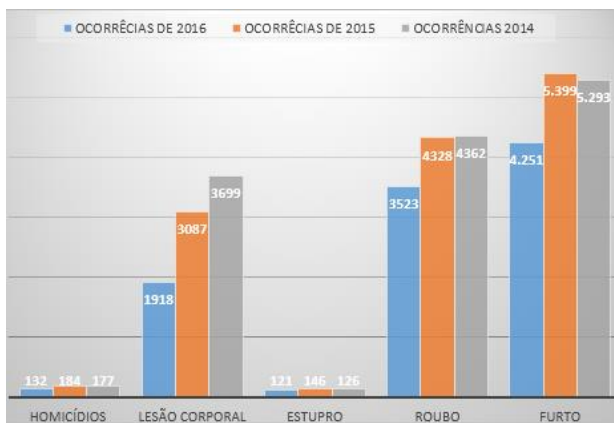


Figure 1 Occurrences SJC in 2014, 2015 and 2016 Source. SSP / SP [8]

3.1 Theft Occurrences

This criminal mode is the most widely practiced (Figure 2), due to the ease or opportunity by the lawbreaker, it will always select their victims beforehand, analyzing opportunity criteria, ease, escape and fragility of the victim at this point already highlights particular victim profile, and preferably women, elderly and children, such victims are not always risk account that are at facilitating criminal action. In the year 2015, they were accounted for 5,399 occurrences of this nature in the city of São José dos Campos [8].

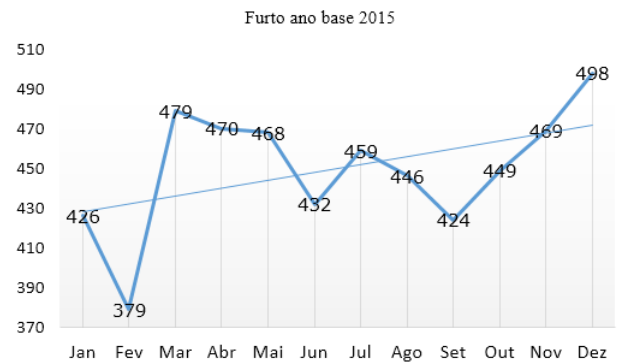
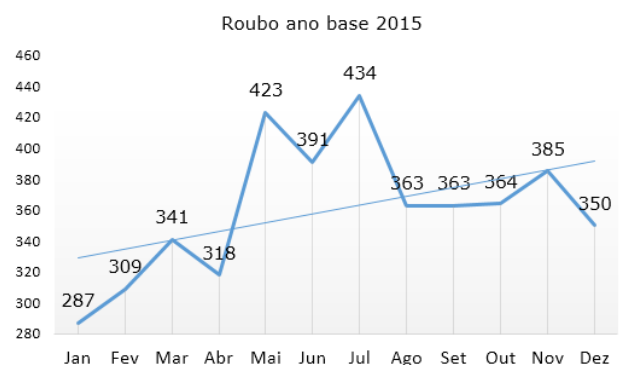


Chart 2 theft occurrences SJC 2015 Source. SSP / SP [8]

Such practices because of its ease of execution may directly impact the transportation system to be implemented, with the technological evolution of electronic devices particularly mobile phones, increased demand for such devices, also generating illegal market, where it sells illicit objects and impacts the incidence of this crime increasingly.

3.2 Robbery Occurrences

In 2015 the Secretariat of Public Security of the State of São Paulo [8], reported to have occurred 4,328 robberies in the city of São José dos Campos, the practice of this criminal modality has the feature violence or serious threat, which generates beyond financial loss, other serious disorders, diseases that attack the nervous system and psychological, as JA Sena, K. Torres, AP Lopes [9], as well as social consequence, have been the psychosocial implications, victims of urban violence, which can be viewed from the perspective of intentionality of consciousness, that is, attributing violence, its causes and consequences, to one's being decisions, being the author himself of his actions, may carry out violence without a cause, acts because is born with violent or instinct is triggered due to a psychological illness, making it not only a safety issue but health in 2015 (Chart 3).



As the Secretary of State of São Paulo Security,

the city of São José dos Campos, reached the mark of 4,328 occurrences of robbery, to combat this criminal mode, a series of measures is needed by society as a change in behavior and public safety agencies working in an integrated manner.

3.3 Rape Occurrences

In 2015 the Secretariat of Public Security of São Paulo, reported to have occurred 146 rape crimes (Chart 4), in São José dos Campos, the rape crime plaguing society today, directly attacking the family as JA Sena K. Torres, AP Lopes [9] sexual violence, is a kind of urban violence that, when it happens in childhood or adolescence, can generate even greater behavior change because they happened in the victim development phase, and this decisive phase for the formation of their character and trust in people.

As J. A. Sena, K. Torres, A. P. Lopes [9] This crime is devastating, violence may involve faithfully on the behavior of human beings, may or may not come to compromise your life in general. So when a particular person is a victim of violence, it becomes subject to a number of changes in their daily lives and in their life. Among these changes, psychological disorders and behavioral changes are usually the first to manifest themselves, totally changing the familiar routine, work and friendship.

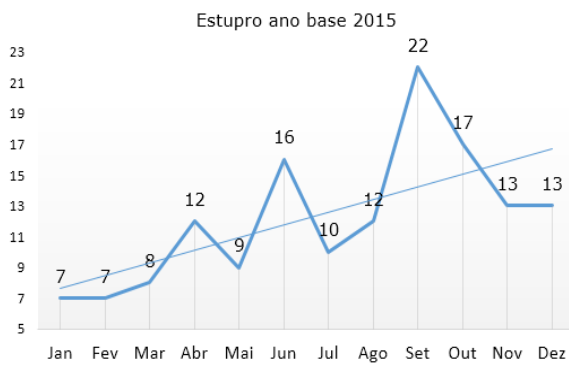


Chart 4: rape Occurrences SJC 2015 Source. SSP / SP [8]

This crime brings up the urgent need to be fought, directly affects the nature of the victim for a long time, being mitigated through hard work, fighting as sustained by J. A. Sena, K. Torres, A. P. Lopes, [9].

The Posttraumatic Stress Disorder is an anxiety disorder that affects the individual who has suffered or witnessed some form of violence, causing trauma to the same, requiring large investment monitoring and specialized treatment in this matter, quoted by JA Sena, K. Torres, AP Lopes, [9] are several consequences of sexual violence and may range from personal injury, death (in extreme cases of violence),

sexually transmitted diseases, unwanted pregnancies and mental health problems that will consequently impair the daily lives of those who have suffered such violence, to combat this type of crime, necessary investments in various government areas, paying attention to education and safety, with regard to public transport, it is of paramount importance that the system offers minimum conditions to combat this criminal practice of so as not to facilitate such practices, requiring specific set of protocols for this offense and shall for this to be implemented in the public transport system, safety programs, mitigating this crime and its aspects.

3.4 Bodily injury

The crime of bodily injury, despite having had a decrease, is still very pronounced (Chart 5), having been 3087 cases in 2015 in São José dos Campos, these events varied in different situations, such as assaults with or no objects and / or bladed weapons and desinteligência, if confined to the boarding stations and / or inside the vehicles, these events can progress to widespread violence generating an increase in the number of victims.

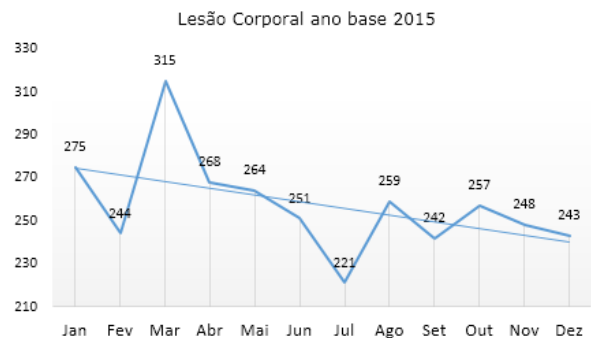


Chart 5: Occurrences of injury in 2015 SJC Source. SSP / SP [8]

3.5 Homicide Occurrences

In São José dos Campos in 2015, there were 184 homicides (Figure 6) according to data from the Public Security Secretariat of the State of São Paulo [8], the occurrence of very serious nature, devastates society as SM dos Santos [10] in Brazil, homicides are more frequent in urban areas, revealing a high level of social tension.

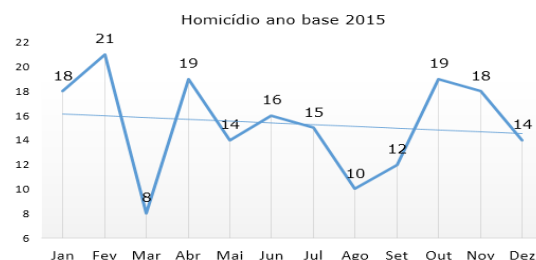


Chart 6: Homicide Occurrences SJC 2015 Source. SSP / SP [8]

3.6 Table of General Events

Although it can not make a direct transposition of the deepening of inequalities to intensify crime and climate of conflict and social disintegration, where today live the great urban centers of the country, there is no denying the synergy between them.

Evidenced user fragility such exposure to this offense as being linked to the phenomenon of them inequality becomes something critical to be fought, taking into account that every state scenario is geared to such an offense, the user has the right to guaranteed life, the way to achieve this commitment is the difference in the urban transportation system BRT, this criterion should be addressed with priority, since it directly impacts the user of this transport, which primarily seek security and secondly comfort, basic items taking into account the expected return on the part of those involved, in 2015 the Secretary of Public Security of the State of São Paulo published have occurred 12,998 occurrences in São José dos fields.

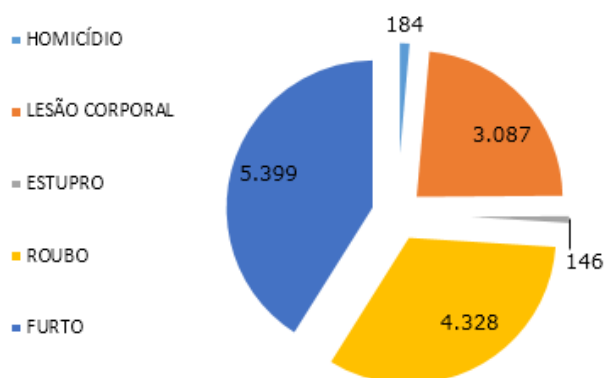


Chart 7: Total occurrences SJC 2015 Source. SSP / SP [8]

The seventh chart shows the number of deaths by logging nature, highlighting in quantity the theft occurrences 5399, stealing 4,328, and personal injury 3087, bringing these events to the urban transport scenario and its characteristic, we see that are crimes that can be practiced in the implemented system, justifying investment necessary to prevent such impacts.

4 Conclusion

The development of this paper aims to analyze the risks and threats involving public transport users in order to favor the creation of operational technical solutions in the BRT public transport system, this solution will meet not only the user, but everyone

involved in the implementation, and post - implementation, security is basic Question on service provision, correctly answer this threat is a basic principle of any public project.

When involves providing service to the general public, the social impact is very great because the financial damage, structural, and image will affect the system indefinitely, thus occurring constant losses. Address these safety criteria favors the decision maker to align the direction of the priorities, and in this case in addition to the costs involved the greater good being prioritized life will be, for this targeting the integration of the services involved, will provide better results and answers, bringing the system as a whole normality in the shortest possible time.

The BRT's for being modern vehicles must in its facilities, predict the occurrence mode of offenses to minimize the likelihood of incidents and facilitating the actions of security forces in cases of emergency. With the use of the technology available today, one should not ignore the technical qualification of the professionals who will work in the BRT system, these for technical reasons should be able to fulfill their duties with responsibility and respect for life, creating a climate of security in the system, raising user confidence increasingly expected success of this implementation will be achieved if there is integration of all strategic sectors, which will override bureaucracy and delay the desired service.

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