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Studying influences of Valiasr non-level crossings on improvement Sari people lives

Abbas ALIPOUR –NAKHI[1*], Anahita DELIRANDE[2], Salime BAGHERIYAN[3]

[1]*Faculty Member and Assistant Professor of Agriculture and Natural Resources Research Center of Mazandaran*

[2]*Architecture Master Student of Rozbahan University*

[3]*Graduate Ma of Geography and Tourism Planning, Sari Branch, Islamic Azad University, Sari, Iran*

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Abstract. Urbanism development, ever increasing usage of private vehicles, and limitations in developing network communications has increased traffic congestions, especially in metropolises. These problems impose burden costs on user, and in case of lack of appropriate response would have negative effect on other aspect of society. Due to traffic overlapping in urban level crossings, these categories of nodes usually accounts as one of full-accident urban passageway, especially in metropolis, like state capitals. As a consequence, available level crossings would be saturated and lose ability of covering traffic and complete handling for travel volume demand in all regions. This study has conducted with the aim of identifying amount of influences of constructing non-level crossings in improvement of traffic situation and thus, on sari people quality lives. This research is descriptive-analytical one and has conducted by self-built questionnaire and field study. Research variables consists influences of constructing this crossings of fuel savings, real price changes around crossings, facilitating citizens accessibility trends toward neighbor streets, operational performance changes (residential, business) around this crossings and decreases in accidents, which have tested using SPPS and non-parametric binominal-test. Statistical population of this research were all citizens of Sari, among them 384 samples have chosen and quarried directly using Demorgan table and simple random method. Results of this research showed that in view point of participants of this study, establishment of this crossing couldn't have positive and significant influences on air pollution decline, time savings, sound pollution decrease, urban perspective improvement, traffic fluent in around streets.

Keywords: Organizing, non-level crossings, Sari, Valiasr

1. INTRODUCTION

Urban traffic and transport, always has been one of key issues in urban studies, because includes one of important role of urban life, which is realizes by human communication and tracing people, commodity, energy and information. (Amini Nejad et al., 2000, 3). Population grow cause many problems in transport system of metropolises. (Hassanpour, et al.,2014) So, increasing traffic in main crossings of city has become one of problems. Establishing non-level crossings causes that traffic has continuous trend. (Heydariyan et al., 2014) Using connecting lines for turning left and right and applying necessary facilities for increase or decrease car speed out of main roads make traffic flows with less interruption. (Geometric design standards intersections,1988) Of course, establishment of non-crossings has positive influences on traffic, but amount of its effect and how much it cost should be determined. (Kazemi et al, 2013 , 36) Meanwhile, reasonable social and environmental management is main factor of initializing and performing project. Projects usually are embodied in programs and specific policies. Influences of these projects are economic, environmental and social effects. Multi-dimensional nature of developmental projects not only includes economic potential effects, but also consist social and environmental potential effects. (Rahim, Sarvar, 2012) One of considerable points in creating

* Corresponding author. *Abbas ALIPOUR –NAKHI*

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these crossings is financial, technical and environmental evaluations. Unfortunately, these evaluations have received less attention and thus, some projects not only mismatch with citizens demands, and fail to attain complete success, but also make some problems for citizens. (Heydariyan et al, 2014) As a result, infrastructure that should be served as a vital artery in crucial situations, cause closure of main crossings and intensifying crisis. (Bavandi Pour et al,2012). Purposes of performing Valiasr non-level crossings include: security increase, effectiveness increase, and streamlining traffic load in Daneshju Boulevard and Khazar square. (Municipality of sari, 2012) Now we want to evaluate if establishment of this non-level crossings realize our purposes or not. As square is one of the strategic and effective points of Sari, it is necessary that we study it. Main note is that in order to solve Sari traffic problem, all province authorities should do all their best to end this problem, otherwise, Sari citizens should tolerate traffic and heavy consequences of urban and interurban traffic. So in near future we would be witness of environment pollution and cultural and social damages in state capital . (Municipality of sari, 2012) Unfortunately, although evaluating social and cultural influences of projects (effect of establishment of them on people lives quality) starts since 1370, involvement of this view has not realized yet and remain in theoretical format. (Heydariyan et al.,2014) So many efforts have done for solving Sari traffic problem, but these efforts were not sufficient. Since number of available vehicles is ever- increasing and this increase needs expanding space for traffic, this increase is not proportional to increase in number of vehicles. If this situation continuous and there be no suitable foresight, traffic and its consequences would become maximize. Therefore, in this study, we will evaluate influences of establishment of non-level crossings on transportation improvement and Sari people lives quality .

2. PROBLEM DESCRIPTION

Today, due to increasing in population, cities become ever-expanding and their problems grow dramatically. Sari, as a metropolis, right now suffers of traffic. It is worthy to note that large amount of traffic and its margin troubles are due to huge migration to Sari. As Sari is state capital and official and welfare centers are centralized in this city and also there is first grade educational and central facilities, thus migration motivates have increased. During spring and summer, which numerous passengers and tourists travel to this city, unbelievable grow to 600000 populations is worsen problem. Solving it needs independent solution in crisis management area. Sari, with 240000 urban and rural populations, is political and commercial center of , and also has industrial-technical universities, in which more than 30000 students are graduating. There are many universities like medical sciences university, Payame Nur University, non-profit institutes, Azad University, and many hospitals which receipt patients from all around province, Radio and T.V organization and infrastructural organization, which make Sari more important. Sari is among few metropolises in which traffic control plans are implemented due to expanding volume and weight of traffic in rush hour. During implementation of these plans, all main streets are become one way and only public vehicles are promise to pass. Moreover, city texture is centralized and in spite of all efforts from municipality in order to decentralizing and improving city, these works failed and as Sari is center of shopping food, cloths, jewel, furniture, etc. and also official centers, banks, holy places are localized there, problem is worsen. Implementation of traffic control plan creates some problems like sound and chemical pollution and heavy traffic for residents, especially for who live and work in those streets. Those streets that involve in control traffic plan include streets, and Amir boulevards, east and west beltways. This plan creates many troubles for residents and continuation it could have mental and social consequences .

Due to high volume of traffic in boulevard and around streets and due to residential, industrial, research and educational and recreational centers around square, establishment of an axillary

path for facilitating traffic sounds necessary. As a result of constructing this crossing, traffic load will decrease and then time and energy would be saved.

Although establishment of bridge in square is very necessary, but all experts believe that result of this project is not satisfying, and in other words, there is no connection between city center traffic and only passengers' traffic and east and west beltway traffic have declined .Thus, constructing overpass bridge in the center of Sari and changing city old texture and performing other professional projects and designs for leaving this crisis is necessary. So, present study is done for evaluating influences of non-level crossing on Sari people quality lives. By identifying these influences and presenting operational strategies, we provide necessary grounds for more effective programming by authorities.

3. THEORETICAL PRINCIPALS AND RESEARCH BACKGROUND

Traffic management means using available facilities, increase in exploitation and maintaining public interests related to transport network. Urban traffic management depends on traffic type. Traffic management plans are different according to different type of roads and people demands. (Sharghi, 2011, 1) One strategy for improving situation of an intersection is geometrical design modification and limitation traffic works, which is a low cost strategy. If this strategy couldn't solve crossings traffic problems, another solution is considered, which consists changing level crossing to non-level crossing. (Haji H0ssynlou, et al)Some of differences between non-level and level crossings are as follows: (Tunnelling and Tunnel Mechanics.2005) According to the research, constructing non-level crossings have more influences on decreasing traffic than level crossings.

In view point of environment, based on formal statistics, more than 80% of pollution in metropolises is due to transportation systems and private car traffics, and today transportation is most important source of greenhouse gases production and biggest factor of air pollution around worlds. Making connection using level crossing causes increase in vehicle congestion and slowing car motions and has direct relation with pollution increase, and also creates sound pollution in region. Thus, constructing overpass Bridge could causes decrease in air pollution, fuel consumption, removing sound pollution for residents. (Managment by desing . 2002 :nellingTu) Establishment of non-level crossing cause fast and easy communication between city center and interurban beltway and decrease traffic in local paths, and eventually, increase welfare of users and residents.(McCollister M.F.2008) In view point of crisis management and save and succor operation, most important factor is fast response to the events and quick accessibility to accident place. So, creating a non-level crossing could help to realizing this aim. (Hassanpour, et al. 2014).

3.1. Type of traffic

Traffic has different type such as mobile traffic, stationary traffic, parking, local traffic, non-local traffic, inner traffic, source traffic, destination traffic, entrance traffic, exit traffic, passing traffic. Now, traffic programming is one of the most important and difficult programming in metropolises. (Farrokh Zadeh. et al., 1997, 12-11).

3.2. Type of non-level crossings

Non-level crossings are categorized based on performance degree of intersections in to two main groups: Interchange systems and interchange services. Interchange systems are intersection of highways, which usually passes high volume of fast speed vehicles. Interchange services usually connect highways or artery ways which have less facilities and abilities for serving fewer loads of traffics. Non-level crossing of this study is interchanging service, which is single point type.In order to evaluate influence of this crossing on residents' life, first we

should identify effective factors in performance and quality of services of this type of crossing. Therefore, way of capacity analyzing of it in HCM 2000 regulation was studied and its effective factors were identified, and results would presented in follows.

One point non-level crossings have just one level crossing in detour, thus, occupied less space than other crossings and need fewer limits. Generally we could say that way of non-level crossings is influenced on quality of available level crossings services in detour. This intersection has guide light and all turning lefts are performedindependently and protected. Figure 1 shows one point non-level crossings. (American Association of State Highway and Transportation Officials, 1990, the Board of Transportation, Highway Capacity Manual Research Report, 2000).

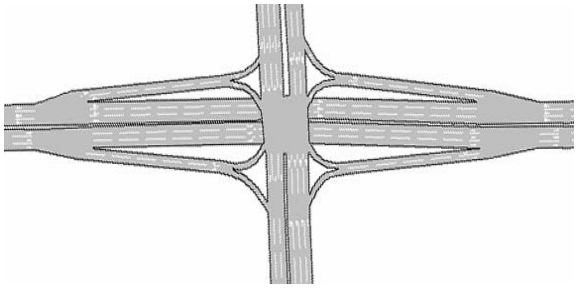

Figure 1. Single Point Interchange.

Generally, any infrastructure is devices, which first should be discussed based on localization suitability, establishment quality, and perspective, and then, consider user culture, way of using devices, rules and traffic furniture. Establishment of non-level crossing has positive effect on life improvement of Sari people. From theorical bases point, we conclude that quality of establishment of non-level crossing, localizing it, perspectives beauty, view position, etc. have major roles in improving citizens transporting and thus, traffic decline. In follow, we try to use field methods for analyzing under study area situation and find experimental answer to study question. It is necessary that we use a systemic and comprehensive approach for determine all constructive urban components (environmental, social, economic, physical) all together in all dimensions and its position in city and society and way of its relation with people about urban phenomenon.

Table 1. A summary of studies on non-level crossings.

Results	Issue	Researcher and year
Other flat level crossings become a promising solution for effective management of intersections due to the existing infrastructure is considered.	Optimal selection of a non-level crossing for a particular location based on traffic and economic analysis	Seyyed Kamal SeyyedHossein (1378)
With proper planning about the location of parking in the city can be stationary and moving traffic significantly reduced.	Reducing traffic YASUJ to focus on the distribution and construction of public parking in urban areas	RashidiFard et al., (1390)
Since taking a holistic approach and comprehensive system in which all of the consideration to be considered essential, element of urban (environmental, social, economic and physical) should be identified and its position in society and how to communicate with people of phenomena identified.	Survey indicators for the effective evaluation of urban identity (Case Jolfa district of Isfahan)	Nawfal, A. et al., (1388)
Geographical or socio-economic characteristics appropriate for every country, the demand for mobility should be addressed by improving the efficiency of this can become transport system and the use of sustainable modes of transport and different parts	The travel planning systems to reduce traffic and pushing citizens to use public transport in urban	Yaqini et al., (1389)

of the system to increase efficiency achieved.	travel	
Design, organization and maintenance according to actual road users is needed, because the street is not a purely physical approach,But as a social and cultural environment and the importance of public participation in the preservation and development, especially by resolution planning is important	Environmental considerations in the design and development of urban streets	Amin zadeh and Dai nejad(1381)
Construction of the project is necessary because of reduced traffic and the nature of saving time and energy on the route Tehran - Karaj is.	Stoning place	Organization and Civil Engineering in Tehran (1393)
The use of level crossings into other potential benefits such as increased level of safety, improving journey times, reduce environmental pollution, storage of capital in the long term and provides a reduction in fuel consumption.	Traffic simulation software, study, compare	Steven L.Jones and artners (2004)
Intersection design diamond divergent that another type of non-level crossing, the first conference in the US city streets was raised. That can be used to better user of this type of intersection. The project benefited from sharing the benefits of phasing and synchronization signals to theoretically improve the signal timing at intersections with high volume or heavy movements.	Exchange new intersection design Intersection coordinated phasing division Diverging Diamond Interchange	Gilbert Chlewicki (2003)

4. INTRODUCTION OF PROJECT LIMIT AND STUDY METHODOLOGY:

Penetration limit of traffic plans include those areas in which traffic problems and created changes or proposed options have significant influence. Therefore determining penetration limit in all transport and traffic infrastructural plans has specific importance, for which first we should study Sari geography. Sari is located in 53' 5' longitude and 36' 4' latitude from east north in about 20 km away from , 49 km away from , 131km away from Gorgan, and 697 km away from Mashhad, and 21 km distance from caspian sea from north and restricted to and Larim from west north, and 22 km away from Qaemshar from west south, 30 km awea from Babol from west, and 60 km away from Amol from south and 41 km away from Soleiman tange dam and 100 km away from Dibaj thruogh constructing Kiasar highway and 120 km away from , Shamirzad and Semnan.Sari is in about 250 km away from Tehran and has 270 km distance through Savadkooh road, 250 km distance through Haraz road and 354 km through Shoma railways to Theran.

In this project, penetration limit based on non-level crossing in Farahabad square have shown in figures 2 and 3.

Figure 2. Non- coplanar position Vali Asr intersection on the Google Map satellite image , 2014

Figure 2. There is heavy traffic on the bridge due to public discontent with the lack of performance Vali highest bridge

This project is descriptive-analytical research and according to the nature, subject and expected purposes for it, is among applied researches.As in this study it has used questionnaire and interviews for collecting required information, we could consider this study a survey research.In this research, required information was gathered in two ways:

A. Reference information has gathered by refer to the books, articles, and related organization's archives.

B. Survey research which has used tools like observation, interviewing, questionnaire according to purposes and questions of research for gathering information. Statisticspopulation of this study is all citizens of Sari, which among them 384 samples were chosen using and Jerci table, and quirred directly. Collected data and research variables have analysed using SPSS software. Variables of this study are citizen satisfaction of performance of Valiasr non-level crossing in relation to air pollution decrease, time savings, sound pollution decrease, urban perspective improvement, traffic fluent in neighbor streets. Relations between these variables are tested using non parametric binominal test.

4.1. Research finding description

1. In this study, most frequency is among male with 83.6% and in follow between female with 16.4%. Result of study about age of responders showed that more than 52% of responders were in range 21-30 years old.

2. Discussing research results showed that most of responders were educated and 43.5% had diploma and 56.5% had high education degrees.

3. According to the research findings, it was obvious that most of responders were self-employed (87%), and in follow were teachers (9.9%), students and employers (3.1%).

4. More than half of responders lived in urban(76.8%), 10.2% lived in rural regions, 6.5% lived in west part of province, 3.4% lived in east cities of province and 3.1% were resident in middle part of county.

5. Based on extracted information from questionnaire, citizens satisfaction of each architectural properties of *Valiasr* non-level crossing according to the place of construction was 28.9%, based on aesthetic point was 26.2%, based on guiding light and tables was 20%, according to plan and design was 15.3%, and based on green area was 8.6%.

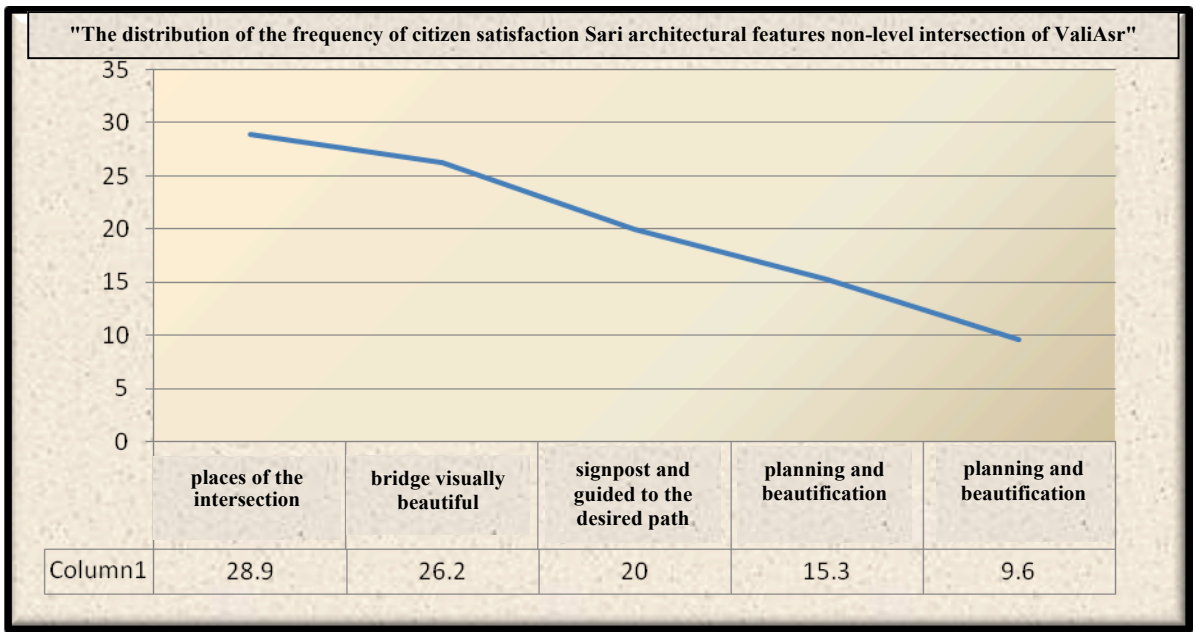

Diagram 1. The distribution of the frequency of citizen satisfaction Sari architectural features non-level intersection of ValiAsr.

6.Based on extracted information from questionnaire(in view point of citizens), effect of construction of non-level crossing on urban perspective improvement is 27.1%, on air pollution decrease is 22.9%, time saving is 20.1%, sound pollution decrease is 19.6%,and traffic fluent from approaching streets is 11.2%.

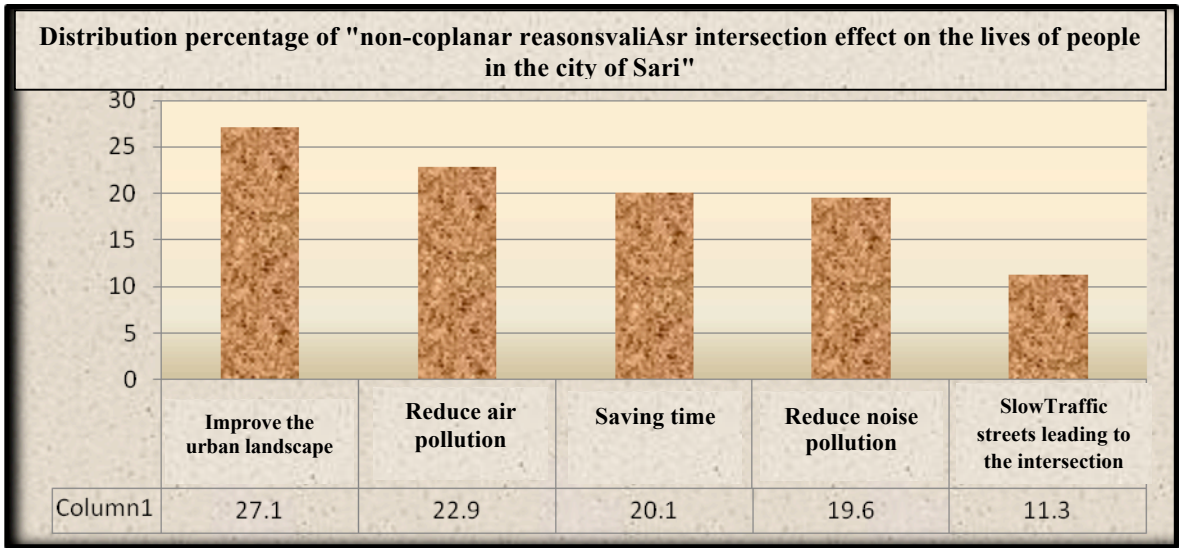

Diagram 2. Distribution percentage of "non-coplanar reasonsvaliAsr intersection effect on the lives of people in the city of Sari.

5. DISCUSSION AND CONCLUSION (ASSUMPTIONS TEST AND ANALYZING RESEARCH FINDINGS):

5.1. Evaluating normality of study variables

Table 2. Results Kolmogorov-Smirnov test to check the normality of the data distribution.

Assumptions / Indicators		Dependent variable	Independent variables				
		Vali Asr intersection of non- flat performance in improving the lives of people in Sari	Saving Fuel	Changes in prices on the real estate	Facilitate citizens' access to adjacent streets	The performance of urban land (residential , commercial) adjacent to the intersection	Reduce accidents
N		384	384	384	384	384	384
Normal Parameters	Mean	1.9661	2.6250	2.8984	2.5938	2.4297	3.1302
	Std. Deviation	1.04789	1.14486	1.05097	.98901	1.08887	1.12355
Most Extreme Differences	Absolute	.322	.225	.227	.224	.224	.219
	Positive	.322	.159	.227	.161	.224	.215
	Negative	-.239	-.225	-.169	-.224	-.160	-.219
Kolmogorov-Smirnov Z		6.305	4.404	4.451	4.399	4.385	4.301
Asymp. Sig. (2-tailed)		.000	.000	.000	.000	.000	.000

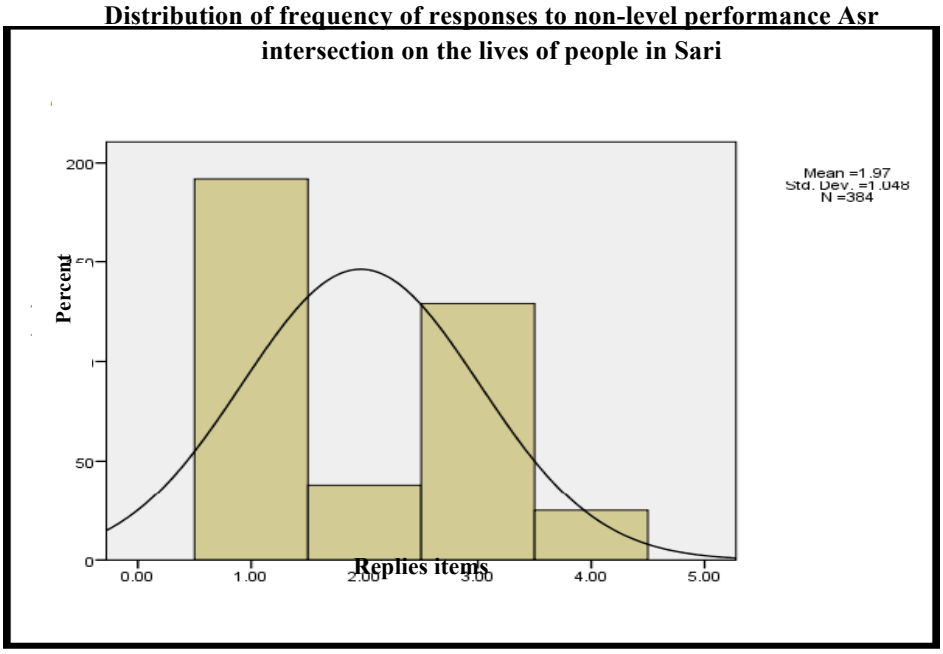

Diagram 3. Distribution of frequency of responses to non-level performance Asr intersection on the lives of people in Sari.

Based on results of table 2, value of z in test for variable of main assumption of research is less than z value in table, and significant level is more than standard level (0.05%). Thus, data distribution difference in this variable is significant with normal distribution and we couldn't assume that data distribution is normal. Therefore, in order to test main assumption of research it has used non parametric binominal test.

6. RESEARCH ASSUMPTION

H1. It sounds that establishment of non-level crossing in sari was not influent on people life improvement.

H0. It sounds that establishment of non-level crossing in sari has influence on people life improvement.

Table 3. Result of binominal test for comparison of answers with less than medium frequencies and answers with more than medium frequencies about performance influences of establishment of non-level crossing on people life improvement.

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
Vali Asr intersection on the satisfaction of citizens, non-coplanar Tasyrahdas Sari performance	Group 1	<= 3	359	.93	.50	.000a
	Group 2	> 3	25	.07		
	Total		384	1.00		

a. Based on Z Approximation.

As data distribution in this study was not normal, thus in this study it has used non parametric binominal test. Results of table 2 shows that frequency of less than average answers are 359 cases (93%), and frequency of more than average answers are 25 cases (7%). As significant level is less than 0.05%, difference of frequencies between two groups is significant in 99%. Thus, null assume, which says that *valiasr* non-level crossing could meet needs and requests of Sari citizens (air pollution decrease, time saving, sound pollution decrease, urban perspective improvement, traffic fluent from approaching streets) is rejected and positive assumption (researcher assume) is accepted.Most important point in this study is effectiveness priorities of this crossing in view point of users (citizens). Analyzing results of comparing these priorities which its data are presents in table 4, show that among five considered factors, highest effectiveness of this crossing is related to " accidents decrease" with average 3.5% and less effectiveness of this crossing is related to " urban application changes (residential, commercial)" in around crossing with average 2.52% .

Table 4. Results of freedman ranking test for comparing performance influences of non-level crossings on people life improvements.

Significant level.	Degree of freedom	Square	Average Rating Friedman	Average	Facilities
0/000.	4	129.310	3.50	1	Reduce accidents
			3.26	2	Changes in prices on the real estate
			2.90	3	Saving fuel
			2.83	4	Facilitate citizens' access to adjacent streets
			2.52	5	The performance of urban land (residential, commercial) adjacent to the intersection

Results of this study is in accordance with Seyyed Hossein research(1989), who studied optimal selection type of non-level crossings for a specific place and concluded that changing level crossings to non-level one could be a helpful solution based on effective crossing management and considering available infrastructures. Rashidi fard, et.al (2011) in article about traffic decrease in emphasized on way of distribution and construction of yasuj public parkings

and suggested that by reasonable programming for localising parkings around city, volume of mobile and stationary traffic could decrease dramatically. Moreover, nofel et.al (1999) in their evaluation discussed effective indices in urban identity and concluded that taking a systemic and comprehensive in its all dimension is necessary. It means that urban constructive components (environmental, social, economic and physical) should be determined and their position in city and society and their relation with people in urban phenomenon should be identified and Steven Jones et al. in their study about traffic, software simulation, study and compare, suggested that changing level crossing to non-level one has potential advantages like security increase, travel time improvement, environment pollution decrease, source savings in long term and fuel consumption decrease. But its establishment of it should be based on urban demands priorities. Gilbert Chelviki (2003) in his study discussed intersection geometrical designs and concluded that divergent rhombic designs which is type of non-level crossing, has better performance for establishment of a project proportional with social expectations and demands, and also avoid negative consequences. It sounds that due to complicated traffic problem in country and its economic and social consequences, constructing axillary paths for facilitating traffic is necessary. Therefore, creating non-level crossings could decrease traffic loadand as a result saving time and fuel consumption and improve citizens' lives. But before performing a design, different aspect of it (such as cultural or social ones) should be declared. Evaluating matches this picture with basic society needs and making decision about project is completely realistic and reasonable. Otherwise, if project is far from society expectations, faces with common un-satisfaction.Therefore some prepositions are presented in this line:

7. PREPOSITIONS:

- ✓ Education and promotion traffic culture
- ✓ Suitable distribution and localizationof urban facilities, services, utilities and equipment
- ✓ Changing traffic path of this part of city
- ✓ Fine lightening foe better sight
- ✓ Making suitable place for using taxis
- ✓ Using under crossing space
- ✓ Making suitable space for passengers and bicycle drivers
- ✓ Geometrical modification of crossings for safe accessibility for passengers
- ✓ Using fair transport system like discover cars for improving traffic control
- ✓ Prepare and testing some assumed scenario which is declare all effects of project implementation
- ✓ Creating projects like multi-story parking which are in public accessibility and constructing passenger overpass bride near *valiasr* non-level crossing cause regularity in vehicles traffic and so decrease traffic congestion
- ✓ And finally, ever increasing attention of organizations like municipality and police to principal programming and approving optimal regulations for modifying driving and

traffic rules and regulations in order to decease traffic violation and also controlling implementation of mentioned regulations in related organization.

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