

Designing Urban Spaces and Furniture for Urban Sustainability with an Emphasis on the Pavement; Case Study: the Area of Abresan Crossroad to Shahid Beheshti Intersection (Tabriz, Iran)

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ABSTRACT: The urban landscape is one of the most important visual forms that reflect the characteristics of a city. One of the most important components in the design of spaces is their landscaping and flooring that explaining the context of urban space and all of its elements, and in this way, it has the power of major influence on the perception of consumers' space behaviour. Bio complex residents are commuting on the sidewalks of the city several times daily to access and work; however, pedestrians should not encounter a mental problem and distress when commuting. Due to the importance of issue, the present study is assigned to the paving or sidewalk in Tabriz from Abresan up to Shahid Beheshti intersection. The area paving has not been made according to the paving standards, has not sufficient strength and will not be able to provide its particular performance for the pedestrians, and due to obstacles on the way that block pedestrians, disabled people would also be in trouble. Research methodology in this area has been based on first-hand field and documents studies and to carry out analyses, SPSS and Excel software has been used.

Keywords: Sidewalks, Pedestrians, Access, Standard, Strength, Material, Performance, Disabled People.

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INTRODUCTION

The urban landscape is one of the most important visual forms that reflect the characteristics of a city. The open urban spaces may include natural or artificial elements and even both of them. One of the most important components in the design of spaces is their landscaping and flooring that explaining the context of urban space and all of its elements, and in this way, it has the power of major influence on the perception of consumers' space behaviour. Designing such a component usually depends on the land performance, structure and appearance according to a street or sidewalk, as well as the form of a square, volume and importance of travel agent in these areas. On the other hand, also the land decoration and coverage as an independent factor has an effective role in defining the urban spaces and can induce, encourage or reject type of traffic or specific in its bed.

Importance and necessity of research

Streets, alleys, squares, parks and generally the city are the specific origin of types of furniture, also any direct and specific effects on the collection of elements and its spaces may not be hidden for anyone. City influences streets and they do on furniture and other urban elements too (Tavassoli and Bonyadi, 1992). Kevin Lynch believes that nowadays the specific pedestrian paths which are designed based on the same incentive of recreational roads but for different vehicles, are rarely observed. Provision of suitable furniture for these paths and their more mobility, makes them humanized, significant and gives them

identity (Lynch, 1997). Walking is still the most important possible to observe places, carry out activities, feeling the passion and mobility of life and discovering values and attraction lies in the environment. Route of Abresan crossroads up to Beheshti intersection of Tabriz is one of important and active routes of the city which attracts many citizens daily due to the location of area in the city that requires suitable and convenient sidewalks and urban furniture design.

MATERIAL AND METHODS

The studied area is located in the eastern part of Tabriz from Abresan crossroads up to Mansour intersection and a part of Imam Khomeini St., it is also for the eastern and western case study and our study is exclusively assigned to the area sidewalk and paving. The research methodology is also a combination of documentary and field studies with an emphasis on field method, and the use of primary data has been through questionnaires and observation. To perform statistical analyses, SPSS or Excel software has been used.

A conceptual framework for the research

Spragens, the architecture critic and theorist believes that space is the essence of architecture and urbanity. Analysis of urban space requires theoretical framework codification that sees the places related to people experience and life and supervises relationship between people and their activities and the spaces they create or in which they reside (Bakrizadeh et al., 2010).

Major criteria for urban furniture design

Major principles which have to be observed in the design and deployment of a variety of urban furniture are as the following:

A) Consistent (fit): one of the major principles in the design and deployment of a variety of urban furniture, is observing the consistent with environment, and this is essential for reaction to the properties, the nature of location and also its desired performance.

B) Respond to the needs of the environment: the design have to be affected by inherent characteristic and the identity of location. A successful and viable plan in the context of time and place is a dynamic plan that constantly meets the needs of its users, eliminates functional needs of the area and adapts it with environmental stresses adversity.

Indicators of design

Considering the following parameters is essential for codifying the indicators of design:

- * Cultural factors including: socio-political conditions

- * Physical factors (natural) including: climate, physical geography and artefact environment

- * Environmental factors including: temperature, rain fall, humidity, etc.

- * Functional and administrative factors including: human motions and dimensions, physical and non-physical standards (Ghanbari, 2004).

Flooring functional considerations

The first effective factor in the design and implementation of flooring is considering the expected performance type of the desired space. The main functions of urban spaces in relation to the type of flooring are: 1. Passage of pedestrian (sidewalk), 2. Bicycles and motorcycles Passage, 3. Passage of mixed vehicles (private, public and bikes vehicles), 4. parallel and separated bands for different vehicles passing (on each path a specific vehicle moves) (Ghanbari, 2009). The paving can be considered as a neutral background, or maybe used as a means to attract attention by furnishing and decorating it, creating a space for meditation, a fun atmosphere representing an important communication node or as an entrance. Choice of materials, texture and colour coordinated together would be effective to create conflict, opulence and a sense of scale. Strengthening the role and characteristics of places, equipment and floor coverings can encourage people to stop or move in a place, in particular, the pedestrians have closely relation with the materials and they would show the different behaviours based on the integrating ground, diverse, foil, shiny, colourful, messy, slippery or rough (Pakzad, 1991). Moreover, the scale space can be defined by it: great patterns for large squares, walkways or formal gathering places and small patterns for alleys, narrow streets, sidewalks and central courtyards (Saeedniya, 2000). The way of maintenance of urban furniture and also the way of parts transmission to repair have to be considered (Harvey, 2001). Urban space itself has no visual beauty. The city can be imagined as a dynamic organism that has body and spirit; the urban furniture can decorate the city spirit and induce visual comfort to the citizens (Hanachi and Mozhgany, 2010).

RESULTS AND DISCUSSION

Residence location

In connection with the residence location that have been questioned, 20% have been out of Tabriz, 24% while passing and 56% have been residents of Tabriz municipality areas round the studied area.

Age

According to investigations, the age of Abresan flooring is between 5 to 10 years old and of course its age maybe less than 5 years in some cases due to the renovation and repair of flooring.

Partnership

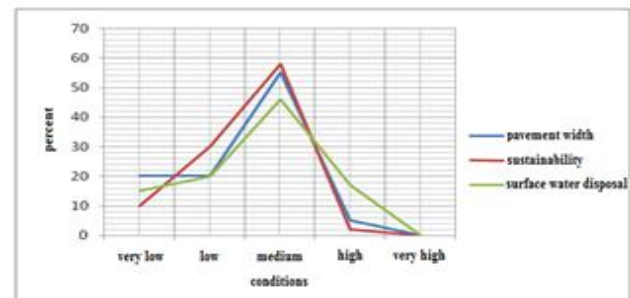
In the design and manufacture of floors, according to the survey of the status of the people there has not been any partnership so that about 90% of responders have chosen the option of too low in the questionnaire.

Maintenance

The cost of maintenance and repair of paving is the responsibility of municipality that based on the questionnaire very low action is being done yearly for paving maintenance and repair.

Table and Chart 1. physical conditions of sidewalk in terms of width and sustainability against climate conditions and surface water disposal

	Sidewalk width		sustainability		surface water disposal	
	number	percent	number	percent	number	Percent
Very low	20	20%	10	10%	15	15%
Low	20	20%	30	30%	20	20%
Medium	55	55%	58	58%	46	46%
High	5	5%	2	2%	17	17%
Very high	0	0%	0	0%	0	0%
Total	100	100%	100	100%	100	100%

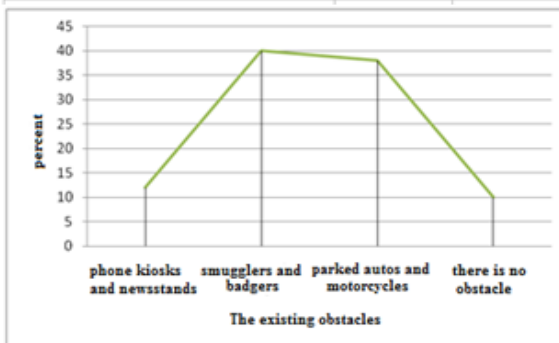


Resource: research studies

According to chart 1 in relation to the width of sidewalk, 55% of responders believe that the rate of sidewalk width is medium, and in relation to the sustainability of the paving type against climate conditions, also 58% of responders have given comment on the sustainability being medium against climate conditions, in addition, in relation to the suitable paving in disposing surface water, again 46% of responders have commented on a medium rate. In relation to the prevention of vehicles entry according to the citizens' ideas and field impressions, no plan has been thought out.

Table and chart 2. Obstacles in the path of the sidewalk

The existing obstacles	number	percent
Phone kiosks and newsstands	12	12%
Vendors and badgers	40	40%
Parked autos and motorcycles	38	38%
There is no obstacle	10	10%
Total	100	100%



Resource: field studies

According to Table 2 that is extracted from the questionnaire which is in relation to the existing obstacles on the path, it can be concluded that 40% of responders have known vendors and badgers as the main existing obstacles on the path, and in the next step 38% of citizens have considered parked autos and motorcycles as the obstacle and 12% have chosen phone kiosks and

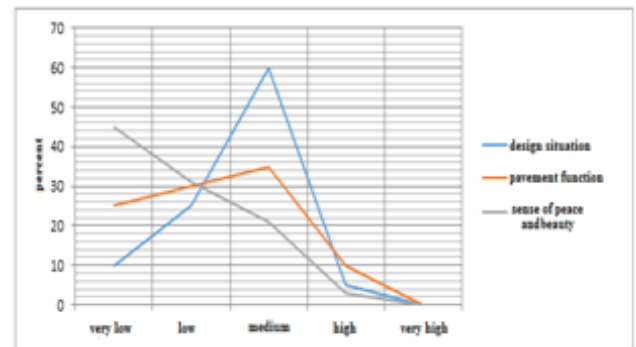
newsstands and also 10% believe that there is no obstacle on the path.

In the design and manufacture of the paving as it's clear of the field studies there is no plans of commuting facilities for physical disabled people and due to the comments taken about 80% of the comments is presenting inappropriate paving for disabled and blinds

According to Table 3 that is in relation with the citizens' satisfaction rate of design situation, special performance and sense of peace and beauty entrepreneur of the flooring, it can be concluded that 60% of responders have voted on medium situation of flooring design, other 35% on medium rate of special performance of sidewalk, and 31% on a low rate of sense of peace and beauty entrepreneur of the existing flooring.

Table and chart 3. design situation, especial performance of sidewalk, sense of peace and beauty entrepreneur

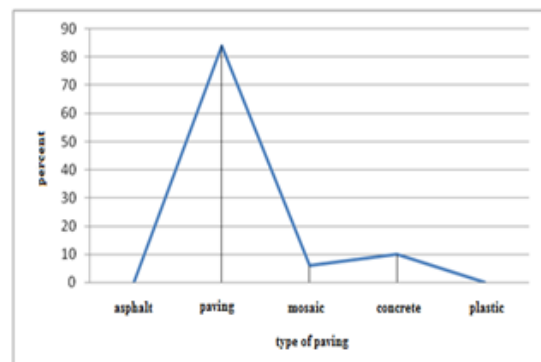
Satisfaction rate	Design situation		Special performance of sidewalk		Sense of peace and beauty entrepreneur	
	number	percent	Number	Percent	Number	percent
Very low	10	10%	25	25%	45	45%
Low	25	25%	30	30%	31	31%
Medium	60	60%	35	35%	21	21%
High	5	5%	10	10%	3	3%
Very high	0	0%	0	0%	0	0%
Total	100	100%	100	100%	100	100%



Resource: field studies

Table and chart 4. Suggested flooring based on citizens' idea

Type of flooring	Number	Percent
Asphalt	0	0%
Paving	84	84%
Mosaic	6	6%
Concrete	10	10%
Plastic	0	0%
Total	100	100%



In relation with the proposed flooring by the citizens, 84% of the citizens have voted on paving, 10% on concrete and 6% on mosaic.

Analysis of variables

A study of relationships between variables of sidewalk width, surface water disposal, edges strength, durability against climate and sidewalk specific performance:

The calculation of Pearson Spearman's correlation coefficient with SPSS software

Correlation coefficient	Width	Edge strength	Performance	Surface water disposal	Durability against climate
Width	1	0.185	*0.211	*0.200	**0.271
Edge strength	0.189	1	**0.299	0.188	*0.248
Performance	*0.211	**0.299	1	**0.300	**0.271
Surface water disposal	*0.200	*0.188	**0.300	1	*0.217
Durability against climate	**0.271	*0.248	**0.271	*0.217	1

A study of the relationship between sidewalk width with desirability for disabled and blinds by Pearson Spearman's correlation coefficient

Correlation coefficient	Sidewalk width	Desirability for disabled
Sidewalk width	1	**0.277
Desirability for disabled	**0.277	1

According to the correlation obtained, it suggests that there is a very positive linear relationship between the two variables; that is, increasing the width of sidewalk the desirability rate would be increased for disabled and blinds.

CONCLUSION

According to the studies of the studied neighbourhood flooring, the existing status of flooring dates back to 5 to 10 years and for its design and manufacture there is no partnership of people yet. The width of sidewalk in relation with pedestrians is medium to low and somewhere it's much less than the standard rate, that obstacles such as bus line coming inside, parked autos and all kinds of vendors and other obstacles have prevented the pedestrians' easily crossing. The neighbourhood flooring has not sufficient strength especially at the edges and while raining the water would not easily excreted. There has not enough green spaces and barrier considered between drivers and passers and the sidewalk is facing with a lack of arboriculture green space, infrastructure in the area has not been properly carried out and mostly the debris has been used, therefore in some of these areas the flooring range would have subsidence over a short time (sometimes 4 to 5 months). In the design and manufacture of the neighbourhood flooring, there has no standards taken into consideration for disabled and the municipality has just built it with its own ideas, regardless of the people's and with its own costs. The beauty elements have not been used in the design flooring such as lightning, create places to sit, benches, and among basic

problems, especially in the southern part of the sidewalk it's sidewalk sewage channels which gives an uncoordinated form to the space and causes reduction of beauty in the studied path. While the channels must be lower than the level of sidewalk that the same and continuity of space could understood. This problem also causes commuting difficulty for children's chair, and wheelchairs of disabled in the area.

Suggestions

1. Flooring belongs to the citizens, therefore in its design and manufactures the citizens and consumers should be considered in priority.

2. Obstacles that are on the path or block pedestrians. (Masts, parked vehicles, vendors, sewage wells) A law or solutions must be passed for it.

3. Creating a green space in this area, especially in the counter of roadways and sidewalks is necessary, to provide citizens with succulence and a sense of beauty in the area.

4. In the design and manufacture of the area flooring, disabled people should be taken into consideration duck considerations for people with disabilities. The width of sidewalk for wheelchairs' move near each wheel is 2 meters.

5. Variation of level on the path of sidewalks with a transverse and longitudinal slow slop is the main obstacle of moving. Therefore, the standard slop must be considered within the area. (Usually between 1.4 to 1.9 %) and in some cases, the longitudinal slope of 2% and transverse of 8% are listed, but the longitudinal slope of sidewalk is 5% to move wheelchair and the transverse slop is 2%

6. Under infrastructure, the neighbourhood flooring should have storage sufficient strength in order not to not be destroyed. To do so, wood, steel, stone, and raised or flat curb stones tables have to be used double strengthen the sides.

7. Along the sidewalks, there must be some places to sit and rest. Creating green space and benches can create a sense of beauty and succulence in the citizens to have satisfaction of the space.

8. Flooring material has to be fitted with the neighbourhood climate and citizens' ideas. Paving is convenient for the area.

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