



Investigation of Positive and Negative affect of Plants and City Furnitures By Design Criteria of Landscape Architecture In The Main Transportation Arteries of Afyon/Turkey

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Received: April 20, 2018

Accepted: May 27, 2018

Abstract

It is an indisputable fact that the streets and the refuge trees and buildings, which have an important position in the open, green areas, the contribution of the city furniture to the urban environment from the aesthetic and functional point of view. The pedestrian way and refuge landscape designs have an important position and amount among open green areas on the scale of Afyon. However, it was identified that the applications conducted were inadequate in terms of aesthetic and functional characteristics and were not suitable for the urban landscape design principles, in general, and the standards of urban landscaping of the streets. In this research, the Main Transportation Arteries of Afyon (Adnan Menderes Boulevard, Kurtuluş Street and Yeşilyol Street) was examined in terms of landscape design criteria that focus on use of trees and street furniture and some suggestions were made by attempting to identify the improvement works that should be performed by the public authorities.

Keywords: Pedestrian, Sidewalk, Landscape design, Transportation arteries, Afyon/Turkey

INTRODUCTION

In urban planning cities, the skeleton of the city and the ways of determining the direction of development and the main function of roads and wide boulevards is that the pedestrian and vehicle movements are comfortable, easy and safe. Roads linking together the various forms of urban use and also makes the task of establishing the connection of rural areas with urban areas. Plants on the road play an important role in reaching certain standards. Trees and other plants, especially roads that serve as roads for the driver, serve with the functions that define the path. It is also effective in locating and identifying the speed and object size of the drivers. Also carries business, shopping and recreational purposes other than transportation for pedestrians (Söğüt 2005, s:113).

When an urban texture is examined; the open and green areas of the city are the most important functional and aesthetic elements of the city. As is known, all open areas covered with vegetation are described as green areas. In these green spaces, the elements connecting mass green spaces are city trees. Urban road trees are the most negatively affected trees in terms of the environment they are in. For this reason, they require more importance and sensitivity than other afforestation studies (Uzun 2007, s:1).

Highway landscape planning and reforestation; is to plan and apply a landscape arrangement and a greening system which allows the traveler along the way to pass through a beautiful perspective. When you look at the history of the cities, it is seen that the habits of planting trees on the roads, squares and promenades in the cities are extended to the very old historical periods. In addition to the visual characteristics of road trees, contributing to the urban climate is to bring human scale to the city, psychological benefits and so on. Has also begun to be evaluated with many functional features and it is accepted that the tree is a very important material providing harmonious connection between nature

and city and human being. Countries with this conception of reality carry out road tree planting based on a specific plan and program (Şengül 2011, s:1).

The streets, boulevards and refuges in the city are the most important open green spaces that the city people can enjoy both recreationally as well as providing transportation by car or pedestrian in their daily life. Pedestrian and vehicle safety is provided along with the aesthetic and functional contributions, as well as the pedestrian and vehicle safety, with the landscape designs created by means of connecting the various urban areas and usage forms (Sağlık vd. 2012, s:77).

Plants located in urban roads have important functions in terms of urban health, bio-ecology, landscape repair technique and traffic technique. It is especially important in terms of traffic technique with many functions such as avoiding and alleviating accidents by distinguishing and directing the road and separating pedestrian and vehicle traffic, restricting the interests of the drivers and screening against the headlamp lights, increasing the safety of the driving and shadowing of the standing traffic.

In order to fulfill these functions, plants must be used in a design that serves the right purposes in the direction of scientific and technical principles (Sağlık vd.2012, s:77).

Features Required for Trees and Trees to be Used in the City

- Trees should be able to grow in poor quality soils with poor organic matter content and poor aeration.
- It should be able to comply with seasonal and apparent temperature changes throughout the day.
- It must have a trunk and branch structure in the strength that can withstand severe winds.
- In order to prevent irrigation in the arid summer months, the deep root system should be developed so that the soil can utilize the water efficiently, and it should have foliage leaves that can reduce the loss of water

- It should not be disturbed by direct sunlight and indirectly from sunlight coming from building surfaces, it should be able to use these sunlights for its development.

- Trees to be used in areas close to pedestrian and motor vehicle traffic should be high and full crowns, not sagged forms. Fruits and seeds should not be large, stiff or stain-releasing so as to damage the environment when they fall.

- Those used in near the building should not develop a very wide and scattered crown form and should not need constant pruning.

- The time of pouring the leaves in the autumn should be short, it should be able to reflect the transition of the leaf colors and the flowers and seasonal changes to the city life (Doğun ve Ok 2006, s:95).

Rapid urbanization in our country, changing living conditions, changing society structure and technological developments affect the development, plans and appearance of cities. With this consciousness, the designers are conducting new researches in order to create contemporary cities with aesthetic values, which respond to human needs and direct their work accordingly. In research on urban furniture it is important in this context (Akyol 2006, s:9).

The buildings around the urban roads and street plantations should be planned and designed according to the aesthetic and landscape basis considering the facilities such as front gardens, lighting, lower and upper building equipment and their future development targets and the environment (Şengül 2011, s:32).

Urban furnishings allow urban life to be more enjoyable and meaningful, creating urban comfort and urban aesthetics. In order to achieve this, the most desirable feature in the design and positioning of urban furniture is the compatibility with the environment. In addition to being suitable for existing or contemplated functions, city furnishings should reflect the characters of the surrounding space (Feyizoğlu 2008, s:3).

Features that should be found in city furniture in general can be ordered as

- Functionality
- Aesthetics
- the cost-effectiveness
- Quick to find, easy to apply
- High feasibility and robustness

- Compliance with building standards
- Be ergonomic
- Having the designer's original lines
- Vandalism resistance
- Ease of Maintenance
- Portability, easy to install and easy to find spare parts

- Suitability for selection of material and workmanship (Feyizoğlu 2008, s:4)

This research was done to investigate whether the most important three street of Afyonkarahisar have been searched in accordance with the positive and negative affect of Plants and City Furniture's by design criteria of landscape architecture.

MATERIAL AND METHOD

The study was conducted in three major streets of the city of Afyonkarahisar. In these three streets, the types of trees and shrubs, the width of the boulevards, the width of the pavements, the type of pavement material, the city furniture and their locations have been examined and obtained. At the final stage, various proposals were attempted to be brought by means of the photographs taken on the spot regarding Afyonkarahisar, municipality activity reports, the interviews with the employees of Afyonkarahisar Metropolitan Municipality Parks and Gardens Department and the employees of Afyonkarahisar Metropolitan Municipality Directorate of Technical Works. A literature survey was conducted on the subject.

FINDINGS

In the study, Afyonkarahisar Adnan Menderes Boulevard with three important streets of the city, Kurtuluş Avenue and Yeşilyol Road were discussed. The roads examined have been given positive and negative examples of road afforestation and urban furniture use. The information

Adnan Menderes Boulevard

The length of the boulevard, which begins from the Muhsin Yazıcıoğlu boulevard and reaches the 31.Regional Directorate of Highways, is approximately 2,2 km. The width of the street, except for the central refuge, is approximately 2-3 m. The material type of the street is asphalt. There is a bicycle path down the boulevard.



Picture 1. Juniperus communis, located in the grass area, prevents walking on the sidewalk.

In the section where the Meteorology Regional Directorate and the Afyon Open Penalty Facility are located, the pavements are about 3m and grass bands are seen on the sides of the pavement.

On the sidewalk the keystone is used as flooring. *Juniperus communis*, located in the grass area, prevents walking on the sidewalk because there is no pruning.

In this section, *Aesculus hippocastanum*, *Fraxinus excelsior*, *Platanus orientalis*, *Catalpa bignonioides*, *Pinus nigra* and *Cedrus libani* were used in refuge.

At the beginning of the problems in terms of plant use on the street is the use of conifers, especially *Pinus nigra*. These species, which are highly affected by exhaust gases, are also blocking the view in traffic because of the pruning fault.

The species used on the sidewalk generally provide shade for the spring because they are broad crown species. However, there were adverse effects such as edge cracks and fluctuations in the upholstery in the parts where the wooden pavilion was on the sidewalk



Picture 2. View of sidewalk

From the Afyonkarahisar Courthouse to the front of the Directorate of State Hydraulic Works, there is a sidewalk between the buildings, an area where children's playground and sports equipment are located

Trees species are used such as *Salix babylonica*, *Fraxinus excelsior*, *Pinus nigra*, *Prunus cerasifera* "Nigra", *Cedrus libani*, *Populus alba*, shrubs such as *Pyracanthacoccinea*,

Juniperus horizontalis, *Syringa vulgaris* are used in the park.

Many of these plant species used in the park due to their thorny species is not suitable for children's playground and seating area. The play area of the children's playground is covered with rubber and iron and wire mesh around it. The park is designed for children aged 2 to 6 years old, with no plaything for older children.



Picture 3. The view of children's playground

Near the garrison, the pavement width falls to 1.5-2 m.

As the electric poles on the curb are positioned in the middle of the curb, the curb is narrowed and people are restricted from walking. The tree species that gave shade in the lawn areas on the side of the sidewalk where the reforestation was done and the relief were positive.

However, the high tall trees are exposed to the negative effects of electrical wires.

Seating areas were built in the grass area opposite the garrison command. Woods are used as materials on benches placed on hard ground. Apart from the bank, covered seating elements are also used. The biggest problem in the banks is not being fixed.



Picture 4. Seating areas were built in the grass area

High lighting elements are used in the study area. Thus, large areas are illuminated. Another problem is that the trash cans are inadequate. Especially the fact that there was not a trash can near the seats caused people to throw their trash around and get polluted.

There is a pool and a fountain as a water area for the field. The fountain is made of marble quite large. It is incompatible with the area as size and material. The pool is not aesthetic in terms of both its position and design.



Picture 5. Pool and fountain

Near the 31.Regional Directorate the width of the refuge is up to 10 m. At the end of the refuge, seasonal species are arranged. This area is heavily used on both the pavement and the refuge with billboard. The use of more bush types has made it easier to see the billboard.

There tree and shrub species such as *platanus orientalis*, *Cedrus libani*, *Aesculus hippocastanum*, *Berberis thunbergii* var. *atropurpurea*, *Syringa vulgaris*, *Thuja orientalis*, *Juniperus horizontalis* in the crossroads.

Although the *Platanus orientalis* is suitable for use at the crossroads, the random planting of other species has caused an ugly appearance.



Picture 6. Crossroads

Kurtuluş street

Kurtuluş Caddesi is a road with high buildings. The width of the pavements is generally 4-5m. In order to break the effect of high buildings on the hill, mainly *Aesculushippocastanum* and *Platanus orientalis* used. *Elaeagnus angustifolia* and *Ailanthus altissima* also used.

Square parquet was used as flooring on the sidewalk.

The sewing pits are kept very narrow and the water of the cleaning supplies of the shop owners on the street is given directly to the tree. These mistakes have had a negative impact on the development of plants. Especially form disorders are seen in the trees.

The lack of parking on the street has created a parking problem on the rather narrow street. The creation of mobiles in some areas has caused the sidewalks to become very narrow.

Although the sidewalk width of the street is 50-75 cm (*Robinia pseudoacacia* “*Umbracalifera*”) and *Fraxinus excelsior* are used. Since the width of the refuge is narrow, plants are planted in a single row and hard ground is preferred instead of grass. Thuja orientalis was used as a shrub. The planting in the refuge is made quite irregular.

One of the biggest shortcomings on the street is the lack of urban furniture. Electricity, telephone, etc., Uneven and neglected panels on the pavement cause poor appearance

There is no refuge when approaching Birlik Street on the street. This part of the path is quite lacking in terms of plant. Because of the narrow pavements, it is seen that it is not done as much as the capacity of afforestation.

Yeşilyol Street

Street, extends from the Kurtuluş street to the intersection of Ordu street and Alparslan Türkeş Boulevard. Due to the intensity of the work area, where many of the people and vehicle traffic.

On both sides of the road there is a pavement of 4-4.5 m wide. On pavement there are *Platanus orientalis*, *Fraxinus excelsior*) and *Tilia tomentosa*. These plants have shown positive effects in terms of shading used for his broad crown.

The middle refuge is 3-4m wide and the ground is grass. There are species such as *Platanus orientalis*, *Fraxinus excelsior*, *Pinus nigra*, *Salix babylonica*, *Cedrus libani*, *Picea orientalis*, *Picea pungens* var. *glauca*, *Robinia pseudoacacia*. The intensive use of conifer species is a misguided idea that these species are adversely affected by the exhaust gas. The biggest deficiency observed in the refuge is that it is not included in the species from the *Symphoricarpos albus* as a bush.



Picture 7. Conifers

There is a pool about every 250 m in the refuge and this area is intensely planted. The use of the pool has added a movement to the street. The only problem is that people do not pay attention to regular and clean use. The refuge is restricted to iron fences and the passage of people outside the pedestrian path is blocked.



Picture 8. Pools

Rosa damascana was used under the medieval trees in the part where the cafes were crowded on the street. Along with this, besides high lighting in the refuge, low lighting is used. All of these have been effective uses in the aesthetics in the refuge.



Picture 9. *Rosa damascana*

The street is also rich in terms of urban furniture as well as vegetable aspect.

There are two fountains in the refuge and on the sidewalk. As well as being useful for people's use, it also provides a nice view on the street in terms of design.



Picture 10. Fountains

There are garbage cans and disabled cordless car charging stations in areas where pedestrian roads exist in refuges. Along with these, the mirrors that relieve certain point of view are placed.



Picture 11. Garbage cans and disabled cordless car charging stations

Although they have great importance in terms of informing people of their advertising and billboards it has been used extensively in both the sidewalk medians unnecessarily.

There is a pool at the intersection of Alparslan Türkeş and Ordu Boulevard. The pool is not well maintained. *Rosa damascana* are used for landscaping.



Picture 12. Pool at the intersection of Alparslan Türkeş and Ordu boulevard

EVALUATION OF FINDINGS AND DISCUSSION

Afyonkarahisar city scale road-boulevards and refuge afforestations have an important share in open green areas. However, the construction of road afforestation is generally insufficient in aesthetic and functional aspects. In the same way, the same problems are encountered in urban furniture.

Urban Road Afforestation Problems in Afyonkarahisar

- The most important mistake of choosing the wrong planting place for plants.
- In Afyonkarahisar city boulevards and refuge plantations, erroneous plantings were made without regard to tree and environment relation.
- The distances of the trees to each other should be determined by the root and top crown sizes that the trees will reach in the future.
- Road and sidewalk width is important for the selection of species.
- The distances of trees and trees planted in the city are not suitable according to the standards of landscape architecture
- Pollen and cannabis of species such as poplar and plane tree planted in the past years adversely affect the people living in the city. These species are found especially on Adnan Menderes Boulevard.
- Yeşilyol street has been used extensively in the past years, especially in conifer trees. Needle-leaf species should

not be used in narrower reflections due to slow growth and frequent and subordinate branching. Specially planted species negatively affect vehicle traffic.

- Another important problem encountered in the afforestation in the city is the low surface area of the road trees. At least 1m x 1m soil surface should be 50 cm x 50 cm or less soil surface is left.

- It seems that the maintenance work done is not sufficient. It seems that irrigation, fertilization, healing of wounds, pruning and insect attacks have not been done adequately.

- There are direct or indirect negative effects of people living in the city. In addition to the removal of branches and shoots, especially the residents of Kurtuluş Caddesi, the drainage of detergent, oil and other wastes from the trees is adversely affecting the development of the trees.

Problems Encountered in City Furnitures in Afyonkarahisar

At the beginning of the deficiencies seen in the city are the trashes that are thrown at the places. Inadequate garbage cans are used in parks and streets. This problem is especially encountered on Adnan Menderes Boulevard.

- High lighting elements are generally used as lighting in the examined roads. Especially Kurtuluş Street and Adnan Menderes Boulevard do not seem to give importance to night landscape.

- On Adnan Menderes Boulevard, benches with roadside parking are not fixed. This has caused people to randomly place and use benches.

- Electricity, telephone, etc. on Kurtuluş Cad. The fact that the panels are located in the middle of the pavement and their rather neglected image is one of the problems on the street.

CONCLUSION

The sidewalk and refuge landscaping made in the city have an important part in the green areas of Afyonkarahisar city. However, when the plant species used are examined, it has been determined that the plants have important problems in terms of their characteristics, the places they use, the spacing of the plantings and their maintenance. Applications made for this reason can not fulfill the function expected from them.

Special planting methods and techniques should be applied in urban urban roads using high quality seedlings with a certain standard. However, neither the species used nor the applied areas carry these features throughout the city. For example, the width of the used sewing pit has been used narrowly. In another example, existing high-tall trees are adversely affected by the pressure of telephone and electric wires.

Another important issue is that the width of the pavement and the central refuge are not enough and the irregularly planted forest passes are narrowed in these areas. In some parts of the pavements, the plants overflowing the road negatively affect the walking of the people. As a result, the most important issues to be considered in the planting work in streets, refuges and pavements in Afyonkarahisar city can be listed as follows;

- Landscape design should not block the field of view of pedestrians and drivers

- The number of plants to be used on the narrow roads and pavements and the planting area should be arranged in such a way as not to interfere with the passage and maneuvering of the vehicles and should not interfere with

the passage of the pedestrians.

- For planting to be done on the edge of the road and in the central refuges, durable and long-lasting species suitable for the urban climate should be selected. The morphological and physiological characteristics of the species to be selected should be well known. Compositions must be created according to the position of the path.

- The plants used on the road should have a short foliage time and should not be used on slippery grounds.

- Can be shaped by pruning and every green green species will be more useful and durable road planting should be meticulous in the selection of plants.

The city furniture used in the streets and refuges in the city is one of the important indicators in revealing the identity and image of Afyonkarahisar city. However, neither the places of use nor their care is sufficient. The most important issues to be considered in the usage of urban furniture used in Afyonkarahisar city streets should be as follows;

- Billboards and plates used in roads and refuges should be positioned so as not to come behind trees or other urban furniture.

- According to the density of the streets, the trash box should be placed in sufficient quantity and size.

- Visually effective pools should be maintained regularly.

- The benches used on the roadside areas as resting places should be fixed and placed as often as possible in order to prevent them from being transported elsewhere.

- Uniformity in lighting elements should be avoided. Low lighting elements should be used besides high lighting according to road, pavement and refuge.

Acknowledgment

The abstract of this manuscript has been published in the proceeding book of International Conference on Landscape Architecture Research (ICLAR 2017). Bosnia and Herzegovina/Sarejova. 06-10 September 2017 and presented as oral contribution.

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