

IMPACT OF STREET'S LANDSCAPE ON PEOPLE ORIENTATION AND ROAD SAFETY IN THE CITY

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Abstract: in this work is shown a sight of the effect of road's gardening on its aesthetic perception and on road safety in cities. Planting of trees are described and the principles of their use as well as the classification of trees by psychological influence on people.

Keywords: *gardening, orientation, street, traffic safety.*

Introduction

The most progressive type of human settlements development is the creation of urban agglomerations, which allows people living in large areas to get to administrative and industrial centers of cities and consequently get higher paying jobs and improve their standard of living.

With the growth of cities, its industrial development is becoming a more difficult problem for the environment and the creation of good conditions for human recreation. Intensive development of the industrial economy is accompanied by significant violations of the surrounding environment.

Gardening of the cities of Ukraine, during the years of economic crisis, was increasingly abandoned, there is a lack of recreational, arts and artistic features, the existing do not carry any information and meaning.

With the building of urban agglomerations increases the number of transport's means, especially individual, the number and length of highway between the cities of agglomeration. There is therefore a significant complication in road markings, making it difficult to orientate drivers on the road and usually leads to accidental road impacts.

To solve the above problems, we propose to approach the landscaping of the streets not only by improving the ecological condition of

decorative and aesthetic appearance, but also by paying attention to the informative planting of trees and their psychological impact on drivers.

Main part

Road-maintenance organizations involved in gardening of roads mostly carry out monotonous ordinary planting that did not change during an extended period of time. This is not the best solution. There is a clear relationship between the aesthetic qualities of highway and movement safety (in primitive solution, monotonous roads planting, traffic accidents are much higher). That is why it is often said: "The issue is not about how much would cost the construction a city's beautiful highway, but about what will cost its imperfection.

Visually smoother road is essential for safe and confident driving. This option does not only requires the usual driver's visual reference points (such as the edge of the carriageway, brow sub grade, concrete pavement joint axis), but also additional information about the direction of the movement (such as the use of contrasting lines marking, boundary lines, columns and bar guides 'interiors, vegetable crops).

It should be noted the ability of shrub planting to soften the consequences of a car coming of the road for any reason. For example, a shrub of 30-

40% provides the deceleration of a car (which came at a speed of 90 km/h on the road and at an angle of 30 ° to the axis of the road) on only 3-4 m.

In lowland areas it is necessary to avoid monotonous planting. Longitudinal planting on urban roads was formerly widespread in Western Europe, directly and not on too long plots. They are good in terms of traffic safety in fog or snow, but under sunlight they give some alternation of shadow bands, that tend to tire the drivers (the most dangerous frequency of alternating illumination and shaded areas are 10-15 per second, which corresponds with a speed of 80-100 km/h and the distance between trees of 2-3 m). In addition, longitudinal plantations create a corridor and close views of the surrounding landscape and building. Application of longitudinal planting in reconstruction and construction of new urban roads is appropriate only for high slopes and embankments along the banks of rivers.

The practice of decorative landscaping orientation of roads provides a visual planting guidance, which can be divided into 4 groups:

1) Direct planting (linear reception) – indicates a change in the movement, from far prompts the driver about the degree of a turn. They can only be linear, parallel to the axis of driving, beyond the roadbed. Their length depends mainly on the radius of the turn, and their line should visually cover the entire width of lanes, a look at the turns at their the approaches (Fig. 1);

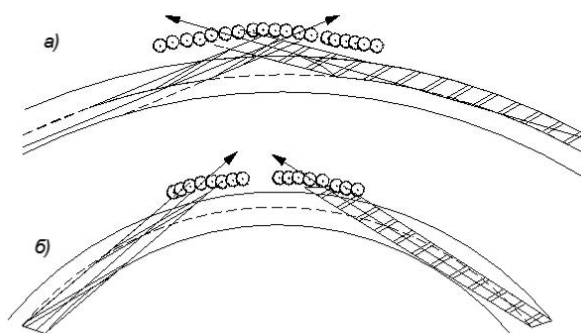


Figure 1: Direct planting on a turn shown in a planar view:

- a) Turn with a small angle and a large radius;
- b) For small radius turn

2) Barrier planting - prompt the driver about the inability to continue moving in its direction,

and at the same time is the visual "reflector" view that forces to move to the right direction. They are planted on the same principle as direct planting: they are needed mostly at intersections, bus stops, traffic intersection, but can be used at venues and leisure complexes and maintenance places (Fig. 2);

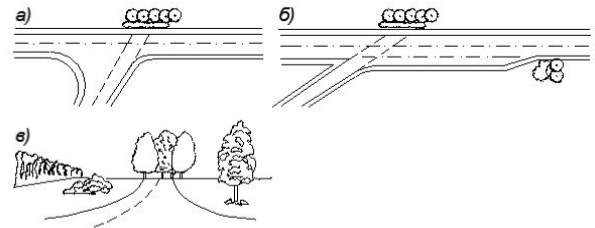


Figure 2: Examples of barrier planting on adjacent roads:

- a) Opposite the driving direction b) at the end of a transitional speed zone;
- c) At a convex vertical turn

3) Emphatic decorating planting – are intended to prevent driver distraction from the most important or potentially dangerous parts of the road (decoratives) or, conversely, to draw its attention or its focus on points of importance or of safety, or for architectural reason of the road (e.g., separation of pools). An example of new approaches and planting can be a gate made by a fractured convex longitudinal profile (Fig. 3);

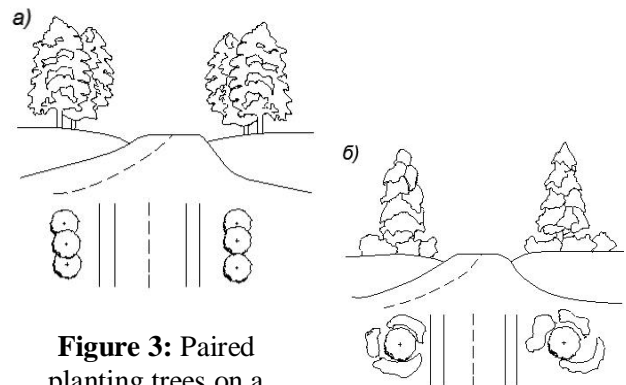


Figure 3: Paired planting trees on a convex fracture of a longitudinal profile:

- a) In an enclosed area, b) in open area

4) Safety (ordinary) planting - the protection of drivers from blinding headlights of oncoming cars; protection from side wind by ordinary trees, shrub planting arrangement that delay car that are leaving the road (Fig. 4);

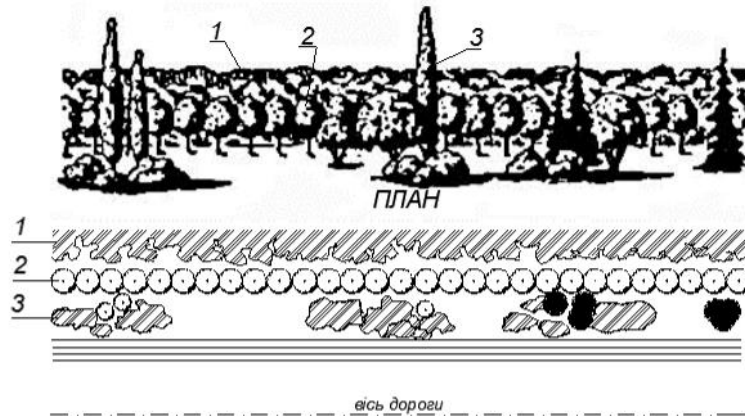


Figure 4: Example of mixed mode of decorative landscaping of the road:
1 – snow protection band, 2 – regular tree planting, 3 – landscape planting

To ensure visibility at intersections and highways adjacent to a level, planting strips are arranged according to figure 5. Estimated distance visibility road surface (L_a , L_b) should be equivalent to the average speeds on the roads and taken in table. 1, A width of the strip adjacent to the road, provides side visibility (L_b) should be 25 m (from edge of carriageway for) roads of I-III rd categories and 15 m for roads of IV and V categories.

Table 1: Estimated distance for visibility of road's surface (L_a , L_b), m

Design speed, km / h	150	Estimated distance for visibility, m	250
	120		175
	100		140
	80		100
	60		75
	50		60

	40		50
	30		40

It is also important when selecting trees to take into account the nature of their psychological impact on humans (Table 2).

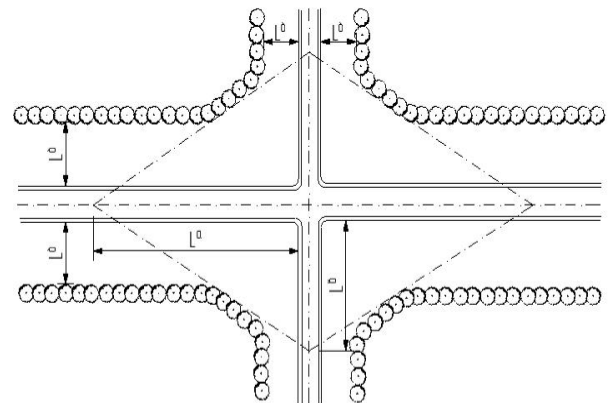







Figure 5: Scheme of planting strips for visibility at intersections of roads

Table 2: Classification of trees by psychological impact on humans

Form type	sketch	Scope of use
1. Annoying		Used for drawing the attention of drivers
1.1 Widely sprawling		Create snow protection strips; design border of country, region, district; fulfill the conditions of the visual orientation at crossroads, at plans with turn and areas with limited visibility
1.2 Narrowly sprawling		
1.3 Conical		Made for the visits of city, entrances of memorial space, creating dominant zones

1.4 Column form		
2. Decelerating		Used to create places of rest and quiet and slow driving rate
2.1 Oval form		planting for recreation, special areas, decorative plantings on Historic streets
2.2 Spherical form		
2.3 Umbrella form		Planting for recreation, create forms on which are placed information signs
2.4 Tear-drop form		

Conclusions

– We have shown the clear relationship between the aesthetic qualities of highway and traffic safety. To ensure the visual smoothness of the road it was proposed to use decorative landscaping orientating roads, namely: direct, decorative, emphatic and protective planting.

– To ensure traffic safety at intersections and highways adjacent to a level, planting strips are placed according to the dependence between the estimated speed and estimated distance for visibility of road surface.

– When choosing trees, it is necessary to consider the nature of their psychological impact on people. Thus, we distinguished class of annoying and decelerating plantings. We should also keep in mind that the form of an object is perceived well only under the comparison with other similar objects, that is why it is necessary to consider the nature of the combination of two volumes of crowns of different architectural structure.

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