A STUDY ON THE NECESSITY OF GREEN PARKING LOTS IN TIMISOARA

STUDIU PRIVIND NECESITATEA REALIZĂRII DE PARCĂRI ECOLOGICE ÎN MUNICIPIUL TIMIŞOARA

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Abstract: Green parking lots are green islands in crowded urban areas. Larger green parking lots have become a necessity in Timisoara. In order to be technically appropriate, they must meet certain demands related to material permeability and natural drainage systems. The vehicle emission metabolization capacity of three species of trees has been studied.

Key words: green parking lots, pervious paving, runoff and vehicle emission reduction

INTRODUCTION

Parking lots are part of the townscapes. Town planners should try to create a balance between the need of parking spaces and other desires of the community as part of their goal: pedestrian-oriented town planning and environment durability [1].

Large surface parking lots accentuate difficulties like pollution and water runoff, increase the urban heat islands and are not a very pleasant sight.

On analysing these drawbacks, one will discover that the most effective way to improve landscape and water quality and reduce pollution is to build ecological or green parking lots [2, 4].

MATERIAL AND METHOD

Green parking lots involve a series of methods applied simultaneously to reduce the total pervious area of a parking lot and the surface temperature and to maintain a green island in crowded areas.

Pervious paving (figure 1) and natural drainage systems reduce stormwater runoff and improve the aesthetic side of the parking lot.

Natural drainage systems or natural drainage green areas include: bioswales, green areas for stormwater runoff collection and the biologically modified vegetal strips that improve water quality and reduce runoff.

Shading can lower surface temperature. The tree crowns cool the microclimate and indirectly reduce the stormwater runoff that permeates the drainage system.

The shading and cooling potential of parking lots (figure 2) is determined by a series of factors like tree species, size, growth, crown density, spatial arrangement and water use [3].

Research work had been done on the trees in the Botanic Park and the Central Park in Timisoara. Three species were chosen for the study: lime tree, chestnut tree and sycamore tree.
RESULTS AND DISCUSSIONS

The building of a green parking lot must come as a result if testing numerous best management practices that filter and water, cause water infiltration and reduce air pollution.

In order to decide upon the best possible variant, the limits that soil, drainage layer, runoff evacuation and groundwater layer impose.

Pervious paving ensure a stable surface and allow eater to flow through the holes in the paving material.

The 15-cm thick drainage layer made of broken stone and geotextile material provides both stable surfaces and underground runoff collection.

Where grass has grown into the holes, a fertile soil layer is necessary (figure 3). In shading parking lots, root system of the planted trees must be considered (figure 4).

Irrigation depends on rainfall and soil humidity and varies with the infiltration speed to avoid water stagnation.

The irrigation water must not increase the flow on the parking lot surface.

When properly designed and built, the following are considered pervious paving materials: porous concrete and road stone, when they meet the vehicle traffic standards.
The general constructive limits of pervious pavement are the following:
- 2% or lower slope inclination;
- maximum slope inclination for any type of pervious paving – 5 %;
- distance between pervious pavement and abrupt slopes – 100 m;
- the tree cover area in the basic calculation – 8 %;
- the estimated final tree cover (increased shaded areas in the parking lot – 2-50%).
Traffic has caused differences in the pollution-related behaviour of the tree species (tables 1, 2).

### The forest species from Central Park

<table>
<thead>
<tr>
<th>Forest species</th>
<th>K ppm</th>
<th>Ca ppm</th>
<th>Cd ppm</th>
<th>Cu ppm</th>
<th>Fe ppm</th>
<th>Mg ppm</th>
<th>Mn ppm</th>
<th>Na ppm</th>
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<tbody>
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<td>323</td>
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<td>119</td>
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<td>672</td>
<td>604</td>
<td>568</td>
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<td>6,3</td>
<td>692</td>
<td>745,2</td>
<td>23,2</td>
<td>555,3</td>
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### The forest species from BotanicPark

<table>
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<tr>
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<th>Cd ppm</th>
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<td>692</td>
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<td>23,2</td>
<td>555,3</td>
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CONCLUSIONS

The advantages of the studied green parking lots include reduced motor vehicle-induced environment pollution and urban heat islands, less UV radiation exposure thanks to tree crowns, reduced stormwater runoff and the potentially prolonged life of the pavement.

In Timișoara’s existing environment, lime tree (*Tilia sp.*) and sycamore tree (*Acer platanoides*) have a higher motor vehicle emission metabolization and air purification capacity than chestnut tree (*Aesculus hippocastanum*). Therefore they should be planted more extensively.

REFERENCES

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