

POLITECNICO DI TORINO
SECOND SCHOOL OF ARCHITECTURE
Master of Science in Architecture for the Built environment
Honors theses

LED AND URBAN LIGHTING: CASE STUDIES OF CONSERVATION AND INNOVATION

by Valentina Cagna, Susanna Lissandro

Tutor: Chiara Aghemo

Co-tutor: Rossella Taraglio

The two courses of study have been completed with an internship preparatory to the drafting of the graduation thesis, one at the technical study "Tautemi S.r.l" in Cuneo and the other at the company "Schröder S.p.A." in Caselette. These internships have been directed to the lighting field and they have defined bases for the construction of the thesis.

First of all it's necessary to highlight the role that light has got into the urban project, because it isn't a city furniture element, but a real design tool at an urban scale: there are a lot of functions which the light plays, such as giving the city a night identity and confidence.

A good lighting project has to satisfy the visual needs of the road user. Key aspects to consider are the quantity and quality of light. Therefore it's important to put in the middle of designing the user.

In latest years there has been a quick spread of advanced systems for urban lighting, such as LEDs and telecontrol.

There are a lot of application examples where the Municipalities have invested in one of these technologies or both of them (Aprica: LED; Castegnato: telecontrol; Arraiolos: LED e telecontrol).

Up to this point the approach has been "passive" type, information have been found partly through a literary analysis of the argument, partly thanks to internship's experience; hereafter there are two "active" type cases, Cavallermaggiore and San Benigno Canavese.

In the first case, study comes from a census taken during the internship, then get to a real lighting design.

In the light of the problems found, there have been defined the choices for the project to improve the environment in terms of lighting.

The choice was oriented towards the use of LED sources: thanks to their performances, the power and the number of luminaires were decreased, increasing the distance between them.

It was also decided to create a scenographic lighting, dedicated to the major architectures of the historical centre, yet little exploited.

In the second case was accomplished directly on site a quantitative and qualitative evaluation about the performance of the urban lighting, as the City has recently undergone a major upgrading of public lighting by replacing the existing luminaires with LEDs sources.

The policy, which resulted in renovation, it is understood through an interview submitted to the local government, from which emerged the important aspects that have contributed to the intervention.

The quantitative evaluation was conducted by defining a grid of measurement points and the use of specific instruments: Luxmeter (measures of horizontal and semicylindrical illuminance), Luminanzometer (measures of luminance), Spectrophotometer (measures of colour temperatures, color rendering and spectral distribution of light).

As regards to the qualitative evaluation, is made a survey subjective submitted to a sample of residents (number of interviewed: 34). The general opinion about the new light was positive: the majority of interviewed prefer the new to the old system, as it has improved the ambience for all types of users (pedestrians, cyclists and motorists).

In conclusion we can say that the positive opinion is the result of a general increase in the urban lighting; very often, also, the LEDs have replaced Mercury sources, whose colour is similar to the new light, and so the transition was not considered so sharp.

For further information, e-mail:

Valentina Cagna: valentina.cagna@gmail.com

Susanna Lissandro: susy_lissa@libero.it