POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE 2
Degree in Architecture
Honors theses

Light and Conservation: definition and application of analysis procedures related to cromatic aspects

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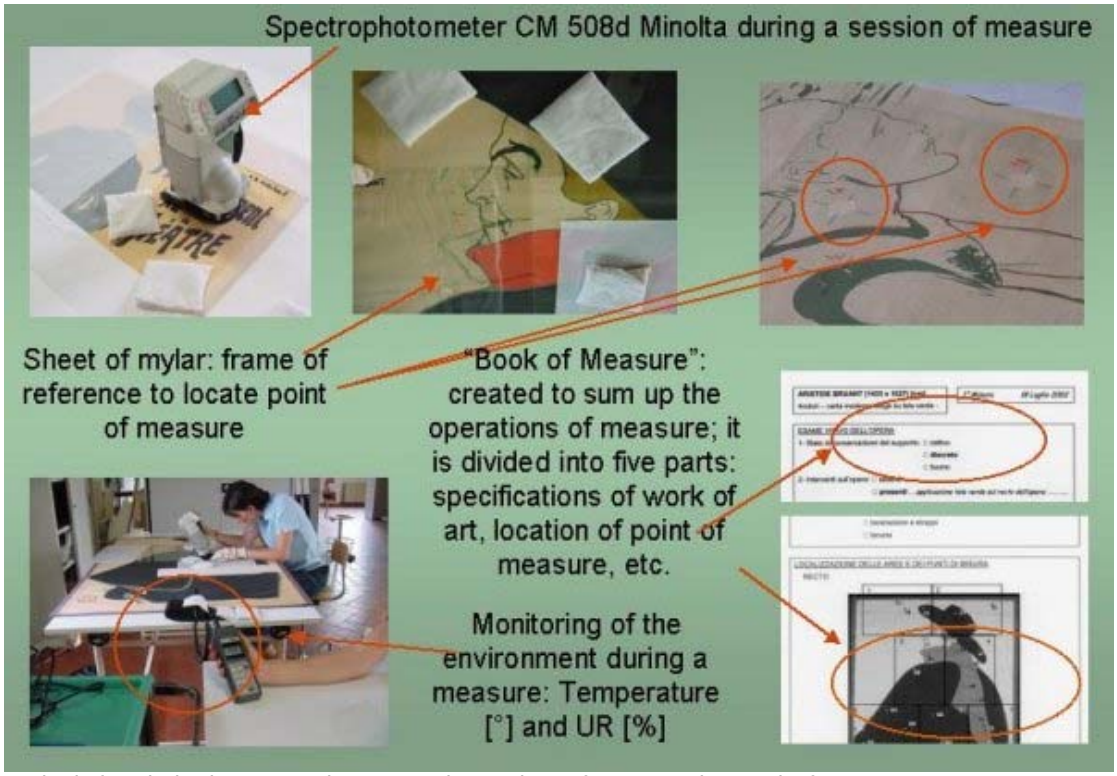
The aim of my research is to study and apply the techniques that are currently used for analysing colour and measuring descolouration, seen as an index of the process of change and degradation that works of art inevitably undergo in time. Even if most of us rarely observe how the colour and the physical state of everyday objects can transform, the effects of this variation in the long term are very well known. It is in museums, though, that the conservation of displayed materials becomes essential. While at first it was thought that conserving works of art basically meant protecting them through careful storage it later became clear that preserving inplies knowing the environmental conditions under which materials are displayed and, most important, the specific characteristics of artworks themselves.
This work developed around these premises, starting from the conviction that the study and analysis of works of art is the best way to "know" artistic materials and thus take steps to preserve them. In particular, the main idea underlying this research can be synthetised as follows: the material reality that surrounds us constantly undergoes a process of degradation that inevitably changes not only its phisical-mechanical performnces but also its aesthetical aspect (colour). Do we dispose of adequate means for the analysis of materials and the study of their transformation?
After considering the main degradation agents (exposure to artificial and natural light, microclimatic conditions, air quality) and their effects on displayed works of art I moved on to studying the techniques and tools used in colorimetric analyses, which are the means that allow us to reach a deeper knowledge of artistic materials. After a general review of the main problems related to degradation and its analysis, I concentrated specifically on colour and on the process of decoloration.
For a long period colour was considered as a specific aspect of the individual's visual perception. Being directly linked to the "sensitivity" of every single person, it was seen as something which could not be communicated on an objective basis (subjective colour). Nowadays, instead, we are aware that colour is also a physical property of objects (objective colour) and, as such, it can be measured and reproduced through specific criteria, accordig to the methods proposed by colourimetry. The aim of this science is precisely to "specify colour through numbers"[1] so that anyone who has a knowledge of it is able to "understand" them
After focusing on the theoretical aspects of colour analysis I extended my research to descover the state of the art in this specific field in Europe (particularly in France and England). My purpose was on one hand to indentify and study the mehods that are presently adopted by some of the laboratories and centres that carry out colorimetric analysis in Europe, and on the other to evaluate the caracteristics and performances of the

[1] The quote, translated from italian, is taken from the book by C. Oleari, *Misurare il Colore: spettrofotometria, colorimetria, fotometria*, Milano, Hoepli, 1998.

instruments that are now on the market. To this aim I contacted several laboratories both in Italy and abroad and I gathered information on colourimetric measurements taken on museum collections whithin restoration and preseservation projects.
These data allowed me to elaborate a procedure that I later adopted in my case study: the colourimetric analysis of five of the thirteen prints by H. T. Lautrec displayed at the GAM in Milan as part of the collection “G. Grassi”. These works of arts are now being restored at the *Opificio delle Pietre Dure* in Florence, with which I collaborated at this stage of my research.

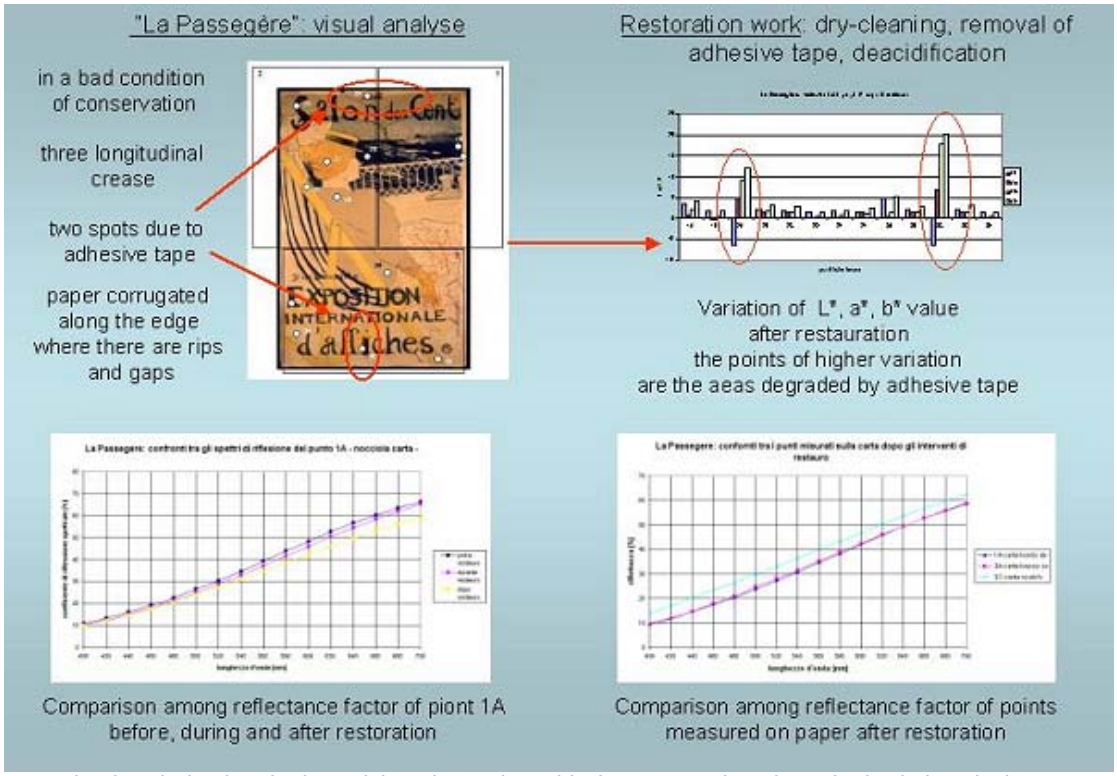
Toulouse-Lautrec’s prints, of C. Grassi collection, analysed

Thanks to this collaboration I could experience directly how colourimetric analysis can be used to check the different stages of restoration. Cleaning, in particular, is very delicate as it should never alter the identity of the artwork and should, instead, act selectively on the dust and dirt that have deposited on it through the years and have, in a sense, changed its essence. Colourimetric instruments allow to monitor objectively the restorer’s work as it evolves and represent an effective tool to detect how the material under analysis is reacting to tratment.
Specifically, in analysing my case study I used a Minolta CM508d spectrophotometer, which allowed a micro-invasive, non-destructive analysis. At the same time I elaborated a measurement recording system, or “book of measurements” wich proved very useful as it synthetises the procedure to be followed during the analysis.



Method of analysis: the spectrophotometer, the tecnique of measure, the "Book of measure"

In the future this system could be fruitfully used not only at every stage of restoration but also after a long term display to collect and compare the results obtained through different analyses. In this way it would be easier to keep colour under control and to prevent unexpected variations, expecially when the intervention is not strictly linked to a graphic medium.



Example of analysis of work of art, elaboration and graphical representation of acquired colorimetric data

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