















face to the rigidity of the spaces (fig. 6a, c) and the second is the same combined lighting devices existing in all exhibition spaces despite the big variety of the collections. For these permanent collections, improving the combined lighting according to every collection requirements will considerably enhance the expographic quality; but in our opinion, if the museum was adapted to the first collections in 1896, today this important cultural heritage deserves to be hosted in a new building museum with more flexibility and more adapted expographic lighting, specially designed for these collections.

## CONCLUSION

Some converted museums offer better expographic lighting than others. Through this preliminary study, it seems clear that the conversion of a building into a museum requires an assiduous appraisal to evaluate the opportunities that the building offers. Strengths and weaknesses should be studied in accordance to numerous factors among which are the exhibition type (permanent or temporal), the collections requirements (2D, 3D, proportions), the conservation requirements and the energy consumption. From the case studies assessment, we retain that more the converted building offer flexible spaces, more it can fit the expographic lighting requirements but with heavy consequence on energy consumption when the natural lighting is insufficient. The Museum of Modern Art of Algiers seems to fit the expographic lighting requirements for temporary collections with the flexible spaces it offers, particularly the central atrium capturing the zenithal natural ambient lighting, even if insufficient. In its category as a museum of temporary exhibition, it seems to be a good example needing extensive study of its artificial lighting in order to reduce the energy consumption. In its category as a museum of permanent exhibition, the museum of Popular Arts and Traditions seems also to be a good example of collections adaptation to the space. The natural lighting is insufficient and the supplying artificial lighting should enhance both the expographic and the historical character of the building. The third museum seems to be the worst example, where spaces don't fit either objects proportions or lighting requirements. The main recommendations we retain from this preliminary study is that in a reused building, the "natural lighting" should be the first considered and foremost factor to chose appropriate collections and to supply with adapted artificial lighting with energy consumption care.

## REFERENCES

- [1] Locker, P. (2011). *Exhibition design*. Lausanne: Ava book.
- [2] Narboni, R. (2006). *Lumière et ambiances*. Paris: Groupe Moniteur.
- [3] Hancock, C., Hinchliff, S., & Hohmann, J. (2009). *Daylighting Museums Guide*. Montana State University, School of Architecture. Montana: Integrated Design Lab-Bozeman.
- [4] wirtschaftskommunikation. (2000). *Good Lighting for Museums, Galleries and Exhibitions*. Berlin: Fördergemeinschaft Gutes Licht (FGL).
- [5] Frey, B. S. (2002). *Designing Exhibitions*. Basel: Birkhäuser Publishers for Architecture.
- [6] ERCO. (sd). Light for museums: Concepts, applications, techniques. (www.erco.com, pdf version, consulted on December 2013 ).
- [7] Zumtobel. (2012). *La lumière pour l'art et la culture*. (www.zumtobel.com, pdf version, consulted on December 2013).
- [8] Cuttle, C. (17 May 2007). *Light for Art's Sake: Lighting for Artworks and Museum Displays*. Oxford: Butterworth-Heinemann.
- [9] Ezrati, J.-j. ( 2008). Daylighting For Museum, A Good Choice? *9th International Conference on NDT of Art*. Jerusalem.
- [10] Ove Arup & Partners Consulting Engineers PC. (2008). Miami Science Museum. DoE Modelling Grant. Light Planning. *ArupLighting* , 1-11. (2004). *Daylighting: Natural Light in Architecture; -Edition:1*.Oxford: Architectural Press.
- [11] Hefferan, S. (2008). Working with Daylight in the Museum Environment. *WAAC Newsletter Volume 30 Number 1*, pp. 22-24.
- [12] Phillips, D. (2000). *Lighting Modern Buildings*. Oxford: Architectural Press.
- [13] Lam, W. M.(1986). *Sunlight as formgiver for architecture*. New York:Van Nostrand Reinhold.
- [14] Davis. (s.d). *Design museum*. Press release. University of California. (pdf version, consulted on mars 2013).