

Design of ASTRA Center for Heritage, Sibiu, Romania

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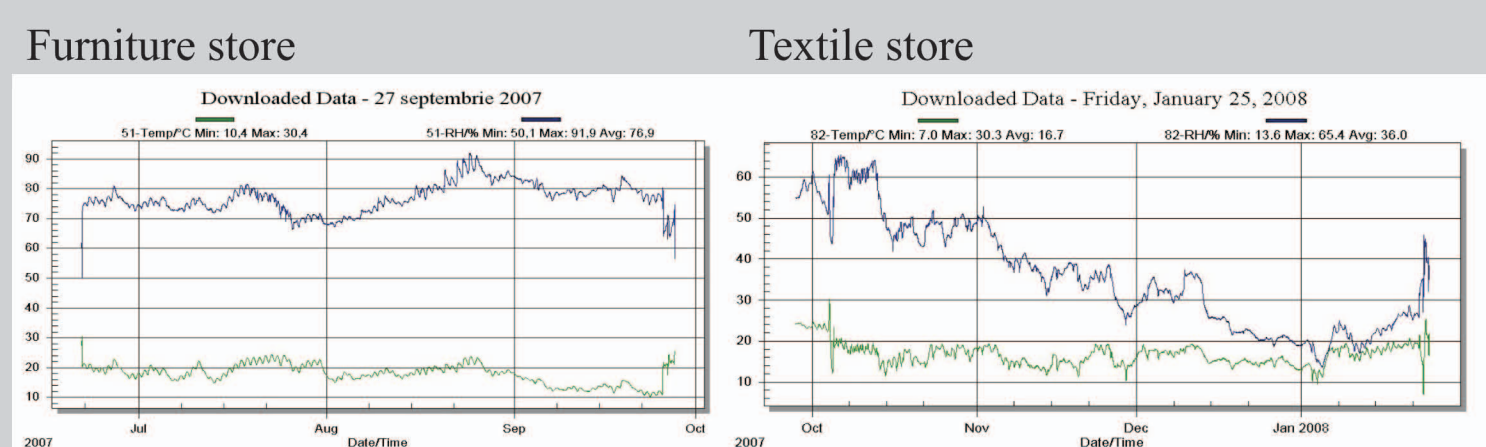
ASTRA Museum is the largest and the most significant ethnographic museum in Romania and has one of the largest open air collections in Europe. The museum is responsible for over 60,000 artifacts and about 300 ethnographic monuments placed on almost 100 ha green area near the city.



The objects are stored in several different indoor locations. In most of these the winter heating is the only climate control measure, in two depots heating is even missing. A part of the collections is exhibited in the monuments of the Open Air Department during the warm period and another part in its central heated exhibition rooms.



The relative humidity in the Open Air Department is fairly high during the whole year due to its location in the woods. Frequent treatment requirement of the vernacular monuments and of the objects located inside them confirmed the persistence of the high RH. Between 2007-2009, relative humidity and temperature were monitored in collaboration with INOE 2000 - National Institute of Research & Development for Optoelectronics in five locations. In the example below (left) high RH values and large fluctuations were recorded in summer. RH value drops below 20% in heated locations during a winter period (right) due to leaky buildings.

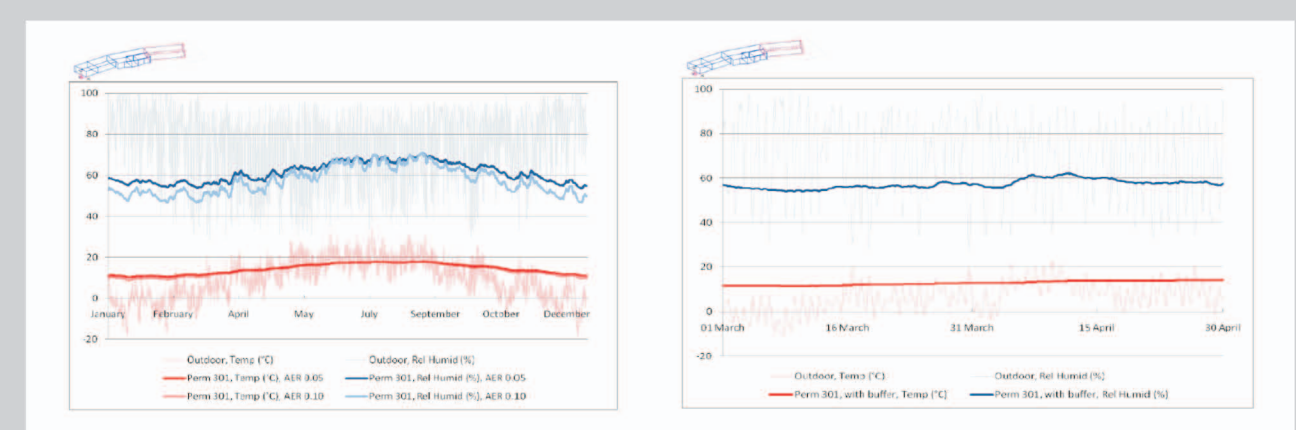


The only suitable solution was to raise funds for adequate new storage facilities. From the earliest stage of the design process of ASTRA Center for Heritage, sustainable use of the future facilities was a high priority demand. It was a very good collaboration between the architectural design team and the conservation department of the museum, conservation requirements remaining a priority in the design. The ground floor hosts mainly the storages, while the conservation/ restoration workshops and a training/ conference room are located on the first floor.



Based on the design, a successful funding project was submitted to the EEA Financial Mechanism, coordinated by Adriana Avram. The overall project budget is of 2,916,238€ and one of its main aimed result is to accomplish the ASTRA Center for Heritage.

The climate control of the designed storages toward a low-energy and low-in-complexity solution was investigated and optimized in collaboration with a team of experts from the National Museum of Denmark. Based on the initial designs, on the recorded climate data and on the climate requirements of the collections, computer simulation of the expected climate were performed for the five storage rooms on the ground floor¹. Storages were assumed fully loaded with collection objects and unheated. The air exchange was assumed low (0.05 to 0.1 volumes per hour). Heat and moisture transfer through the construction (adjacent rooms are heated to human comfort) and moisture buffering by the walls and the collection proved to ensure temperature and relative humidity within safe conservation limits for most of the year. Additional mechanical dehumidification will be needed in the metal store for the whole year and in the other depots for the high RH periods in summer. The simulated climate in one of the storage rooms for a whole year is shown in the left figure below. On the right, a closer look to a period of two months predicts small daily fluctuations.



The architectural design focused, besides ensuring a proper climate for the stored collections, on other aspects of preventive conservation as well. For proper transportation and objects handling possibility, the passageways on each level leave enough space for safe circulation. Stairs were avoided, with alternative ramps/ elevators for object transportation. Enough room and proper shelving for the comfortable placement of the whole collection will be available. Lighting in the storages will be kept at minimum; low energy lamps without UV emission will be used. To prevent water damage, water proofing of the storage area ceiling was specified. Entering with security cards and video surveillance will assure the security. The controlled climate will stop biological decay; access of any possible infestation will be blocked by frost treatment of the introduced objects. Dehumidifiers will be placed outside the storages and connected to each storage room by a re-circulating closed loop of ventilation ducts. The low leakage of the building will prevent outside pollutants from entering the storages. Anyway, due to heavily treated objects, high level of internal pollutants are expected. Air cleaning will be performed by chemical filtration of the re-circulated air. Building monitoring system will record in real time climate parameters. Experience of similar museum buildings² shows that no heating and occasional mechanical dehumidification is the least energy consuming method to ensure a proper climate in storage buildings.

The building is under construction and should be completed before September 2010.



Acknowledgments

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¹ Ryhl-Svendsen, M., Aasbjerg Jensen, L. & Klenz Larsen, P. 2009. Report: Simulation of the designed climate in ASTRA Center for Heritage (Center for the Conservation, Restoration and Improvement of the Cultural Heritage of the Open Air Museum Dumbrava Sibiului, ASTRA National Museum Complex). Job no.: 15514-0001. Project no.: 289511

² Padfield, T., Larsen, P.K., Aasbjerg Jensen L. & Ryhl-Svendsen, M. 2007. The potential and limits for passive air conditioning of museums, stores and archives. In Padfield, T. & Borchersen, K. (Eds.) *Museum Microclimates, Contributions to the conference in Copenhagen, 19-23 November 2007*: 191-198. Copenhagen: National Museum of Denmark