Experts' Roundtable on Sustainable Climate Management Strategies

The following is an edited selection of the two-day roundtable discussion that took place at the Experts' Roundtable on Sustainable Climate Management Strategies in Tenerife, Spain, in April 2007. This event was organized by the Getty Conservation Institute.

Topics addressed during the two-day roundtable included current climate management strategies and emerging trends; the advantages and disadvantages of climate control; the meaning of sustainability in relation to the preservation of cultural heritage; and whether cultural institutions such as museums, archives, and libraries can or should play a role in the debate about energy consumption.

The following are selections from the roundtable discussion organized by topic.

Current Issues in Environmental Management

Global climate change—more specifically the increase in extreme weather patterns and rising sea levels—together with a growing demand for energy and its impact on energy supplies were identified as major threats to the preservation of cultural heritage. The reduction in energy consumption necessary to combat climate change would have a direct impact on the way we live and will affect the way we take care of our cultural heritage.

Roman Kozłowski: The European Commission–supported project on global climate change's affect on cultural heritage [NOAH'S ARK] looked at the impact of a climate change modeled over the coming hundred years on various cultural heritage materials and came to the conclusion that the picture is not so clear. When you look at the deterioration function and risk factors for materials, some regions will be better because they will be drier and there will be less corrosion; some regions will be worse.

Tadj Oreszczyn: It is the indirect effect which is probably going to be more significant because energy is used in everything we do. [We] are going to have to significantly reduce [our] consumption of energy. That is going to change the way people behave. It's probably going to change the cost of energy or energy is going to have to be controlled some other way through rationing, which will probably change our behavior in ways similar to the changes that we've had due to the introduction of electronic components, wireless and mobile phones, and computers over the last fifty years. I would predict that we would have similar social changes that will occur through trying to tackle these issues, and they will have impact on the ways that people use buildings and the sorts of conditioning that people use, etc.

Several trends were identified that have already impacted the preservation of our heritage. One is the increasing demand for human comfort and a dependency on mechanical systems to achieve this:

Dario Camuffo: If we want to use a historical building, a very high standard of comfort is requested nowadays. Churches cannot be unheated anymore—as the numbers of churchgoers decreases, churches want to make themselves more comfortable. Winter heating is not enough; people may also want summer cooling. Is all this sustainable?

Strongly related to this issue are the high costs of implementing and maintaining mechanical systems in the museum environment:

Stefan Michalski: Many museums can't afford the kinds of capital costs needed for control systems, and even when they are provided money by some layer of government, they then find within a few years there's no other layer of government that's providing maintenance and operating costs. And so we're starting to see, and have seen for some time now, systems that museums installed in the 1970s and 1980s coming up for replacement.

Richard Kerschner: Even if we do not consider global warming, most medium and small museums simply cannot afford to put in any type of major systems, especially when the very existence of some of these poorer museums is in question.

Ernest Conrad: We have to understand that the engineering community is not a leader in mechanical systems, we're a follower. Our mechanical systems are a result of what the conservation community tells us to do. Regarding the choices of mechanical systems, I remember twenty-five years ago when energy was dirt cheap, the most important thing was to maintain relative humidity. So we designed precision climate control systems. And then it starts to get expensive and so people said, "Oh, oh, let's change our priority." How about stability? So we moved into the world of stability. And stability says we can have gradual drift, that seasonal fluctuation save energy and money; and save some condensation damage to the building. But now we're being told that we have to control fluctuations. The only problem is we don't have any rules. We're in a bit of a vacuum when it comes to being told to control fluctuations. We are the ones that have to design the systems that are energy efficient and actually produce a product that matches the requirements of fluctuation.

Sustainability

The group discussed sustainability and its meaning in the context of cultural heritage preservation.

Sarah Staniforth: The National Trust's definition of conservation first and foremost recognizes that conservation is the careful management of change. It accepts that we can't keep things the same but what we can do is to influence the rate at which they change. It's all about understanding the significance of those places and sharing that with people and ensuring that the special qualities are protected, enhanced, understood and enjoyed both by people today and

people tomorrow. And that's really in a nutshell actually the definition of a museum. The definition of conservation is stating what sustainability should be. Sustainability has three elements. It has the economic elements, the environmental elements, and the social elements.

I believe that preventive conservation is one of the roots to sustainability through enabling sustainable access—minimizing the impact of visitors on places and also welcoming the benefits of increasing access which enhances or helps the financial bottom line and also helps people to see authentic objects in the context for which they were made. And the whole route to that is through risk management and the use of the preventive conservation framework.

I think that what we do as museums and what conservators practice actually are ways of demonstrating sustainability. Another definition of sustainability would be to not use more resources than are needed, not to steal resources from future generations.

Air-conditioning Alternatives

Many cultural institutions are housed in historic buildings, which were often ingeniously built to passively control the indoor environment. However, the knowledge of how to use and operate these buildings has nearly been lost. The process of recovering this knowledge and achieving sustainable solutions in climate management depends heavily on human support and engagement. It requires not only a change in attitude (e.g., adaptation of clothing to seasonal changes) but also active participation in making low-tech approaches work (for instance, closing or opening window blinds to affect the indoor temperature). Roundtable participants explored a range of strategies that would allow the control of indoor climates to be less dependent on conventional air-conditioning systems. For example, implementing passive environmental control in the design of new buildings and using materials that are suitable for the climate region the building is in—practices that today are often secondary to aesthetic concerns—can create more appropriate indoor climatic conditions.

Michael Henry: On the issue of building design, I think we have to recognize that we're talking essentially about three building types: one is historic buildings; [second is] archives and storage which are not occupied and offer tremendous opportunities for inherent stability; and then [third] contemporary or new construction for museums which have to balance this question of signature building, public appeal, thermal comfort, and a host of activities that are unrelated to object conservation.

Tim Padfield: One should never make a historical building into a museum that contains objects that don't belong to it. In terms of energy use, damage to objects and general discomfort for visitors, you cannot beat a museum in a historic house. If you want to save energy and be sustainable and all that, then you should in fact ban putting new museums into old houses. Museums should be built for the purpose. But having said that, you've then got to notice that most modern museums are even worse than historic houses for exhibiting things. And so if I were to pick out my own personal hobby horse, it is that museums are very badly designed technically because they are simply show pieces for the architect. They are in fact sculptures. If we want to make a statement, we should say that architects and those who judge competitions should both specify and judge on suitability for preserving and exhibiting the collection.

Michael Henry: [On] this question of operability of the building envelope to maintain an interior environment, it can be a hybrid approach. It's not necessarily to say it's in the absence of systems. But in many climates there are days that are quite favorable to collections' conditions but because we've sealed the building up for the system, we can't take advantage of those if we have free cooling, or free heating, or free ventilation. But one of the obstacles that I encounter when I'm looking at how to operate a building envelope is the lack of knowledge about how it was traditionally operated. And I think it would be worthwhile if we could encourage some research in that area.

Climate Requirements for Collections

In designing more sustainable climate control measures, the group discussed climate requirements for collections and felt it was worth exploring the relatively new concept of "proofed climate conditions" for collections. This means looking at the history of the climatic conditions an object or collection has been exposed to and assessing what damage has actually been caused by these conditions. This research can then inform our decisions on what climatic conditions are required in a specific situation.

Stefan Michalski: Climate requirements for artifacts—I once provided a table on what I thought were artifact "needs" versus artifact "wants." The conservators, who felt that they were advocates for the requirements of the collection, generally would give a list of what they wanted, which—if one looked a little skeptically at it—was a much longer list than what the artifact needed, especially when you're trying to negotiate that with the wants and needs of the building and the wants and needs of the occupants. I found that if you tried to look at all the traditional wants of the building, the collection and the occupants, there was no hope of finding any kind of middle ground. They would always be in conflict. If you talked about the needs, you could reduce the number of conflicts.

The idea of the proofed fluctuation is a relatively powerful and novel concept which has not been part of common knowledge until recently. It's an intellectual tool in our field in order to get out of certain impasses which relate to historic buildings and sustainability. Although fluctuations are not the most important climate aspect for real risks to collections, in my opinion, it does seem to be the biggest issue as far as what I think are wrong decisions for climate control in cultural heritage and buildings.

Richard Kerschner: As conservators we can get away from the science by examining our collections, asking what conditions the artifacts have been proofed to, and determining how close we can safely approach these climate extremes in the future. This leads to the much less complicated approach of avoiding even

wider extremes. I think it's really important to get this word out to the conservators in the field. Get them to look at their collections keeping the "proofing" concept in mind (i.e., the climate extremes the collections have experienced in the past).

The Cost of Control

The group agreed on the importance of managing environmental conditions in a responsible manner with respect to the capital (equipment and installation) cost and energy consumption. It was felt that collecting data on the cost of achieving stable museum environments (including capital cost, energy consumption and maintenance) in various types of building and climate regions would be extremely useful information for heritage institutions.

Michael Henry: Cost of temperature and relative humidity control. If we look at the degree of control, you can see the cost, either in energy or in dollars, of the degree of control goes up exponentially. This isn't new. And the economics do play into this because sooner or later an institution has to deal with it.

We have to be able to tell stewards what the implications are in capital costs and in operation, for the decisions they make about fluctuations and the necessary degree of control. We have to understand the tradeoffs that are going to be made because those tradeoffs might not be against whether they do that system or not, the tradeoffs might be against whether they have fire protection or fluctuations, which goes back to risk management.

The Role of Cultural Institutions

The group considered that cultural institutions, by serving as role models, could help educate the public about sustainability issues.

Sarah Staniforth: I think that's a real function of museums, to inform and educate, and to show the ways in which we can be energy efficient—we think about our energy use, we maintain the buildings, and we conserve the collections. And

that's a great opportunity for people to learn about that and then take that back to their own buildings.

Michael Henry: It's about our impact on the world and on the environment around us. And what better vehicle do we have than our historic properties to inform the public about the effects of climate change, about adaptation to climate, human adaptation to climate, and human comfort. So it's not just about the threat but it's about our impact and our lifestyle.

Areas for Further Research

Several areas for further scientific research were identified: Collecting data on the cost of control (energy consumption, installation and maintenance costs) by comparing building types with different degrees of control in different climate zones to actual indoor climate conditions could result in an extremely useful overview of the cost of the degree of control. It could help decision makers decide the level of control they want and the level they can afford. Another research topic was identified as the validation and fine tuning of computer models, which are increasingly used in the design process of buildings and systems. Another area of research was identified as the material response to short -term fluctuations. But it was also recognized that a large amount of scientific data and practical experience is already there to help guide the field. It was stressed that recording proven fluctuations of objects and collections in the field would be extremely valuable.

Sarah Staniforth: I don't hear any of us saying anything different today from what we have been banging on about to each other probably for the last fifteen or twenty years, yet the word isn't getting out. So we're doing something wrong or we're not leading enough on this subject. I think that the research idea is very valuable, but we might want to push in a second direction— actually taking this

as an opportunity to disseminate more widely those ideas about appropriate technology for small museums and museums in historic buildings.

Conclusion

The participants felt that continual professional development by means of education, training, and the dissemination of information for the different professions involved in environmental management strategies for museums is very important. Among these are not only conservators, but also architects and engineers that work in this sector.