Problems of Indoor Climate in Exhibition Halls in the Czech Republic - Survey

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In the course of time all materials deteriorate and draw nearer to their inevitable destruction. What is understood as a matter of fact situation with objects of everyday use can catch us unawares with objects of artistic and historical value which we would like to preserve in unchanged form for the future generations. Still, great efforts of experts are exerted and no small public finances spent to stop, or at least, slow down this process regarding monuments and collections of artistic objects.

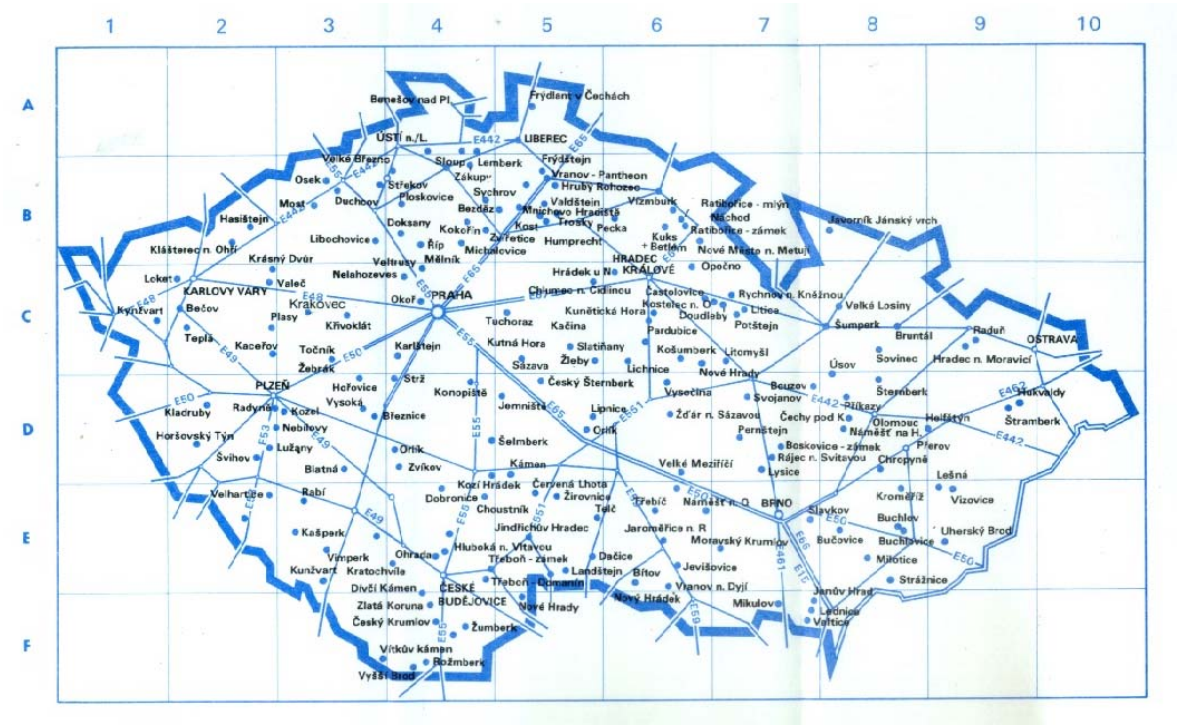
Until recently it was generally believed that artistic collections in expositions or depositories of institutions under expert guidance, i. e. in galleries and museums, are taken best care of in this respect. It is not true, unfortunately. These public institutions house most works of art of top value, whereas only a small percentage of these can be found in private collections. However, from the point of view of various parameters of the quality of indoor climate, the collections open to the public are in far greater danger than those in private hands. One of the reasons is the very fact that the exhibitions are open to the public. Thus the pollution (dust) of the indoor atmosphere usually increases, biological attack is more likely, and relative humidity is unstable. There is also greater risk of theft and damage by vandals and the works of art are exposed to light for a long time for the benefit of visitors. While the conditions at exhibitions are far from perfect, the situation in depositories is sometimes even more lamentable. Also the system of every-day activities necessary for the service of museums or galleries (daily cleaning, changing the places of exhibits, in connection with change in the exhibition loans for exhibitions elsewhere, etc.) too, raises the risk of potential impairment of the objects. Even if museum workers show great loyalty to and enthusiasm for their profession, the interest - both emotional and economic - of the owner of private collections is undoubtedly greater.

Corrosive effects of the atmosphere on works of art and protection against them have become the focal point (of museum workers especially) in our country only in the last 20 years. The aim of museum workers and conservators is to preserve the particular object in its maximum authenticity, i. e. with minimum (potential) interventions (restoration or conservation). It seems that the way of protecting collections from the corrosive influence of the atmosphere, i.e. preventive protection is much more friendly, and, moreover, much cheaper, then repetitive cycles of conservation or restoration.

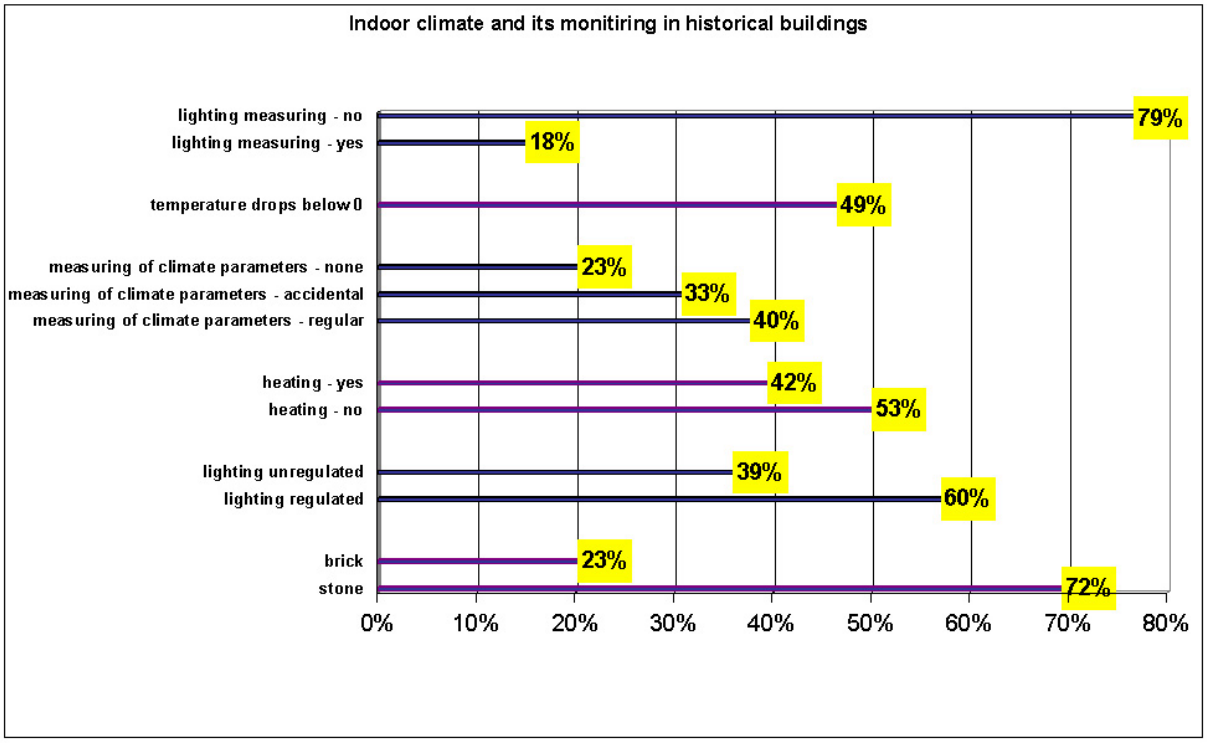
Preventive protection endeavours cut down the negative influence of climate (RH, T), light, outdoor pollutants (sulphur and nitrogen oxides, ozone, dust, soot) which of course make their mark in interiors, as well as of indoor pollutants. The indoor pollutants include decomposition products of materials of furniture in storage rooms and products resulting from adaptations of interiors (acetic acid from oak wood and from vinyl acetate dispersions, formaldehyde from chipboard, volatile substances from varnishes), substances arising due to some installations for example ozone, or substances used in the past for conservation and desinsection of the objects which continue to evaporate.

Museums and galleries are usually situated in city centres and the amount of pollution and dust especially on the lower floors is considerable. The furniture of the storage rooms mostly dates back to the 60s or 70s of the last century, i.e. the time when not too much attention was paid to these problems and it is chipboard and polyvinyl chloride coverings that provide a massive source of internal pollutants.

Apart from museums and galleries there are about 250 castles and chateaux open to the public whose period installations serve in fact as museums.



Part of the installations are also paintings and tapestries, about one-third of these buildings also house rich castle galleries. The climatic situation in these spaces substantially differs from that of public galleries or museums.



It is influenced by the very building material which is 70% stone. 53% castles and chateaux are neither heated or tempered at all and in almost 50% (of the total number) temperature in winter drops locally below zero. Basic parameters of the climate are measured regularly only in 40% of buildings, lighting is regulated (curtains, blinds,...) in 40% of buildings, its intensity, however, is measured only in some 15% of buildings. On the other

hand, the level of air pollution in these places is substantially better than in most museums or galleries due to the fact that they are mostly situated outside big cities and industrial areas and the amount of outdoor pollutants there is low. Modern materials evaporating the indoor pollutants practically do not exist there. A problem of some importance may also be the volatile means used in the past for conservation, desinsection or restoration of objects of art.

Corrosion engineering concentrated on the protection of engineering products and military technology in particular, had a long tradition in the Czech Republic (or the former Czechoslovakia) in connection with the traditional Czechoslovak heavy industry. *A top establishment concerned with corrosion engineering equipped with very good appliances and apparatuses as well as personnel used to be the SVÚOM (State Research Institute for the Protection of Materials). This institute does not exist any longer in its original form as a result of a faulty and rush privatisation measure.* However due to the highly developed heavy industry Czechoslovakia ranked among the states with highest air pollution in Europe. Especially content values of oxides of sulphur in some industrial areas in big cities, including Prague, many times surpassed the hygienically allowed limits. A remarkable change for the better (as far as air pollution is concerned) arrived in the late 90´s thanks to changes in the structure of industry and to some new laws for the protection of environment and the strict control of their observance. Highly beneficial was the desulfuphurization of thermal power plants and heating stations.

Spheres of activities and projects concerned with the indoor climate of exposition and storage spaces in recent research:

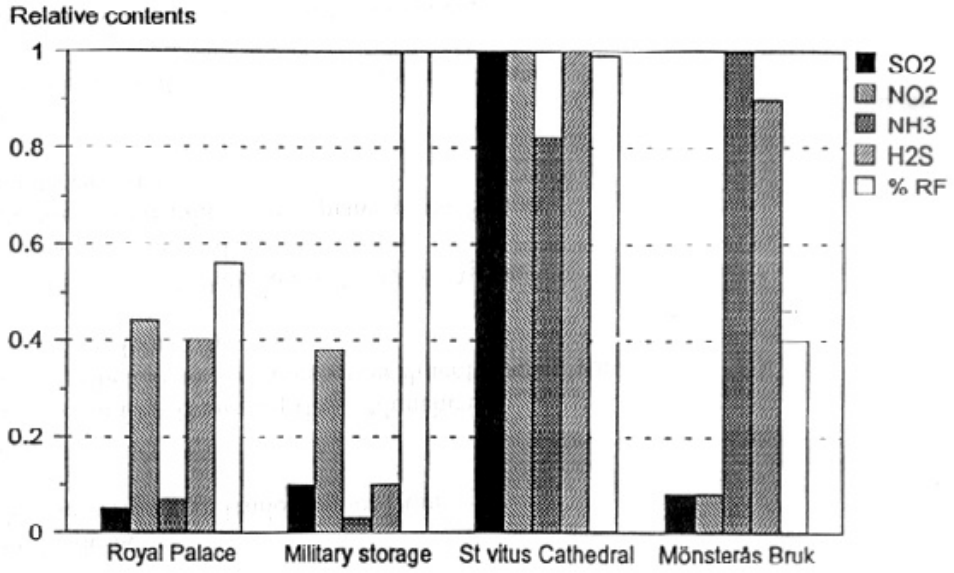
In the last 15 years intensive attention has been paid to the problems of preventive conservation in the Czech Republic by the Association of Museums and Galleries (AMG) - a professional union of conservators and museum workers receiving considerable help from the Czech ICOM Committee. The AMG holds annual seminars, thus offering opportunities to specialists to give lectures related to these subjects. These events are regularly attended also by specialists from the industrial sphere.

Problems of paper and parchment corrosion influenced by environment (polluted air, intensity of light and length of exposition) has been long dealt with by the Conservation Department and Laboratory of the **Public Records Office**. This institution regularly holds specialised seminars for archives and library workers and provides teachers for some schools educating conservators and restorers of paper. One of the tangible outcomes of their work was the exact assignment of technical parameters for a new building of the **Public Records Office.** The complex of buildings opened this year include the desinfection unit, depositories for documents, photographs and negatives, service rooms, reading rooms, conservators´ and restorers´ workshops, an exhibition hall and service spaces for holding conferences. In Europe it is a top establishment. (A conducted visit is to be held.)

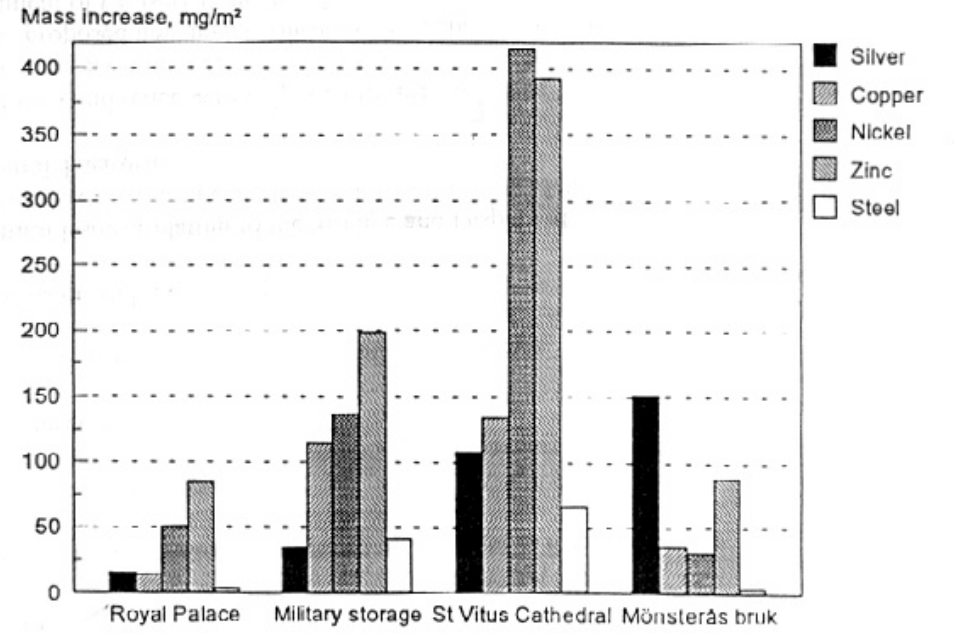
The State Institute for Heritage Preservation and central methodical establishment for the sphere of care of monuments sets up methodical instructions for regional institutes that are in charge of most historical monuments, housing expositions open to the public. These days a methodological handbook for continuous care both of buildings (castles and chateaux) and collections and expositions in them, is in preparation. A major part of this publication concerns the parameters of indoor climate, their monitoring and assessment as well as their impact on the different materials of the collected works of art. The handbook is to come out in 2002.

An international project „Environmental Effects on Corrosion in Indoor Location - Basis for Assessment of Risk and Damage and Counter Measures“ , coordinated by the Swedish Corrosion Institute, was taking place between 1991 -1994 with the participation of the SVÚOM. The participating countries were Sweden, Norway and the Czech Republic. Four localities representing four different types of less aggressive indoor environment were chosen for the pilot project: historical monuments (Bernadette Library - the Royal Palace in Stockholm, St.Vitus´s Cathedral in Prague) and industrial localities (an unheated military storehouse at Karlstad and a paper mill at Monsteras Bruk). At all the above localities samples of metal (Ag, Cu, Zn, Ni and steel) and, at the same time, the quality of indoor

environment (T, RH, SO_2, NOx, NH_3, O_3) were monitored. The figure shows the obvious relation between the level of air pollution on the one hand, and increase in corrosion products on the metal samples on the other.



Relative concentrations of gases and relative humidity measured at the different test sites.



Mass increases for different metals after one year exposure at the different test sites.

Less specific problems of indoor environment are dealt with by the National Museum in Prague. In the year 1999 - 2000 the National Museum took part in the second term of „Team Work for Preventive Conservation“, an international (European) project organised by the ICCROM and financed by the EU. Altogether seven European museums (Barcelona, Birmingham, Budapest, Leyden, Brescia, Ferrara and Prague) participated in this project. Each of them, together with international consultants solved its own specific problems. As part of the project the National Museum in Prague held a seminar in 2000 on the problems of preventive conservation and published a comprehensive manual for the use of workers in this field of work. Moreover, within a project of the Ministry of Culture of the Czech Republic the National Museum has been pursuing a long term task of monitoring the corrosive effect

of oxides of sulphur and nitrogen on metal materials in relation to the level of pollution in the surroundings of the museum building, and also the level and composition of light in selected parts of exhibitions in the course of the year.

The Department of Technology of the State Institute for Heritage Preservation in Prague is one of the institutions taking part in the research work on „Li-Do“ project within the 4th Frame Programme of the EU. Other participants represent: Germany, France, Great Britain and Italy. The aim of the project is to develop, test (in actual conditions) and see through, i.e. prepare for industrial production, special actinometers - sensors for low-level lighting. These should be made use in monitoring indoor environment exhibited objects highly sensitive to light.