



Natural Stone Monitoring as a Tool for Sustainable Conservation of Cultural Heritage

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After completion of conservation measures natural stone monuments often are left to themselves for a long time until new serious damage is observed. In most sectors of health care or engineering technology regular control and maintenance is a common method to ensure long-term functionality. In contrast, regular inspections of historic facades are very rare. If they take place, they usually are limited to a visual diagnosis. An investigation of the weathering progress which is induced by form of invisible changes of the interior stone structure is undertaken in very few cases only. Thus the time when a small intervention is recommended to avoid the development of heavy damage is easily overlooked. To enhance the acceptance of a systematic and regular monitoring 26 stone objects were examined in the framework of a research program supported by the German Environmental Foundation.

The program had several aims like a long-term control of stone monuments after conservation and an evaluation of new and common test methods. Furthermore the project focused on the evaluation of conservation methods and materials which includes the identification of conservation problems belonging to product, stone type or application technique. Last but not least recommendations for each monument were elaborated regarding future control intervals and renewal of conservation.

The work was carried out by different working groups spread over Germany. For investigation only objects have been selected, which had undergone well documented conservation measures some 10 to 25 years ago. To get comparable results, a limited set of predominantly simple and non-destructive test methods was selected (Karsten Tube, Pull-off test, micro drilling resistance and others). In the next step the research team had to come to agreements to standardize measurement conditions and data interpretation. The evaluation of the results obtained from all monuments have been discussed by the whole research team.

The experiences and data were also used for the compilation of a guideline for the monitoring of monuments made up of natural stone. Besides the increase of scientific knowledge and the practical use for conservators and architects in some cases also economic aspects could be pursued. This way the economic value of a regular monitoring could be proved.

Comparison of data from different monuments built of different stone materials and weathered under different environmental conditions is difficult. Nevertheless important conclusions concerning the long-term stability of conservation materials and the compatibility of specific stone types and certain conservation methods could be drawn.