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The historical and cultural heritage from Brazil: rocks and deterioration patterns

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This summary provides information on the results of a research in progress, which focuses on the investigation of stone materials, as steatites, serpentinites, quartzites and schists, widely used in construction of buildings belonging to the cultural heritage of Brazil, especially in those that are in the state of Minas Gerais. These historic buildings, some of those with more than three hundred years of existence and constructed with the use of different rocks, function as open-air laboratories and because of that assists on the study of the deterioration of these materials. In its early stages, the research has focused on macroscopic characterization of the employed materials, following with the lifting of their respective areas of occurrence. Then samples for the survey of other features, such as its chemical and physical-mechanical properties were collected. The investigated physical-mechanical properties were as follows: thermal dilatation coefficient, compressive and flexural strength, abrasion resistance, water absorption coefficient by capillarity, real and apparent density, total and open porosity. Currently, the research focuses on issues such as: evidence of degradation and extent of deterioration in these monuments, as a result of the performance of different processes of alteration and decay. In this investigation it is understood that the first processes are associated with modifications of stone materials, which do not necessarily imply in worsening of the characteristics of these materials from the point of view of conservation and seconds are related to chemical and physical changes of intrinsic properties of rocks used in the construction of this heritage, which can lead to a loss of value, or some impediment of use, according to the indications of the illustrated glossary on patterns of deterioration of rocks proposed by ICOMOS. For this purpose macroscopic descriptions of monuments and its applied rocks, accompanied by detailed photographic record and sampling, this last whenever possible, were made. Through macroscopic descriptions was possible to identify the presence of numerous cracks, elevations and detachments of outer layers from some rocks, separation of layers, disaggregation of individual grains or aggregates of grains, loss of original surface due to mechanical action or not, resulting in the presence of smoothed shapes, loss of parts of sculptures, so as the presence of cavities or alveoli formed on the surface of the rock. Were also observed: the presence of crusts by accumulation of exogenous materials and rock itself, color changes, eflorescences, incrustations with surface morphology and color different from those of stone, patinas, graffiti as a result of vandalism and different degrees of biological colonization, involving the presence of mold, lichen, algae and plants. It is hoped that the data obtained may contribute to the indication of preservation methods most recommended for each case of observed deterioration. Considering that the majority of these materials remains exposed to external areas, these efforts will be sufficient only to delay the actions and minimize the effects of these processes of deterioration.