

DETERIORATION OF LIMESTONE SLABS IN INSIDE WALLS OF THE BUILDING OF THE BANCO DE PORTUGAL IN BRAGA

1TELES, M. and 1BEGONHA, A. 1 Faculdade de Engenharia da Universidade do Porto

A pathologic study of the deteriorations observed in the slabs covering the inside walls of the building of the Banco de Portugal in Braga was carried out. Two types of limestone (yellow and grey) were used in the slabs, both showing the same type of deterioration (flakes). The yellow limestone is more porous than the grey, exhibiting higher intensity of stone decay. In addition, the deterioration affects grey limestone slabs till 1.80 meters above the ground and 3.00 meters in the yellow limestone slabs. X-ray diffraction and scanning electron microscopy analyses were carried out in samples of flakes as well as chemical analysis in one sample of ground water in order to establish the causes and mechanisms of stone decay. Arcanite, niter and secondary calcite were identified in the yellow limestone and nitratite and apthitalite in the grey limestone. The very high levels of nitrate, calcium, chloride, sulphate, sodium, bicarbonate and potassium in the sample of ground water could indeed be the source of the soluble salts present in the flakes of the limestone slabs. In fact, ground water rises by capillarity through the porous network of the two limestones, evaporating specially near the surface of the slabs, allowing the crystallization of the minerals of soluble salts responsible for the genesis of the flakes.