

DURABILITY ASSESSMENT OF CONSOLIDATION EFFECT ON SANDSTONE MONUMENTS

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Abstract *The façades of St. Leonard's church and the castle in Atouguia da Baleia village in western region of Portugal are monuments built in Middle Ages. Significant stone degradation patterns are visible, being the alveolization an outstanding case study.*

The more porous type of sandstones similar to the variety found in the vernacular architecture of Atouguia da Baleia was treated with ethyl silicates. In order to allow the study of the durability of these conservation treatments, accelerated artificial ageing salt crystallization tests were carried out and an automatic ageing chamber was developed.

Physical and mechanical behaviour was assessed on consolidated specimens before and after accelerated artificial ageing salt crystallization tests. The authors propose a prediction of the durability of these consolidation treatments by means of the salt crystallization ageing results.

4. CONCLUSIONS

On sandstone specimens were applied two ethyl silicates (TG and R). The experimental study of physical and mechanical behaviour revealed minor harmful characteristics of the R applications on M variety of sandstones and a better consolidation effect of TG.

Salt crystallization artificial ageing tests highlighted good durability of R applications and a worst behavior of TG treatments. Regression equations allow to extrapolate data for more than 60 experimental ageing cycles carried out, being predictive of the compressive behaviour of sandstone specimens before and after treatments with consolidating products.

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