



## **Deterioration of marble cladding: Facade assessment as a basis approach for restoration measures**

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The use of marble as cladding material has led to an increasing number of buildings with durability problems all over the world. The most typical feature is the bowing of marble panels. The often result is a reduction of the service life of such claddings and finally a cost intensive exchange of the facade material. The building owner or responsible decision maker, respectively, needs to know what actions have to be carried out aiming both to save funds and to ensure sufficient stability of the facade panels in order to resist wind load. As a basis for required measures detailed facade investigations have been performed at the State and University Library building in Goettingen (Germany). Most panels show a severe bowing after 12 years of exposure depending on the exposition (height above ground, orientation), the panel size and the fixing system. Bowing was found to be connected with a loss of grain cohesion leading to a reduction of strength parameters up to 60 % and to an increase of the relative frequency of cracks. The analysis of the present state allows a careful estimation when a critical level of strength loss of the respective panels is reached. The combination of both petrophysical examinations on behalf of the geologist and static calculations on behalf of the civil engineer serves as a decision basis for further actions.