



Historical structure materials in earthquakes

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Most often, historically relevant buildings are touched by the wearing of their construction materials. Through this, urban constructions are uniformly affected throughout the whole building fabric. Different from this, natural disasters like those caused by earthquakes have a non-uniform impact on urban areas as well as on individual buildings. In both cases the collapse mechanisms for buildings with structural elements out of certain construction materials are determinant for where is the historical building fabric the most vulnerable. Historical building materials are part of the characteristics of buildings worth to be preserved, which serve in urban environments as testimonials of the past. They are not only endangered by the damages induced by the natural catastrophe by itself, but also through the construction measures, which serve either the reparation of these damages or also the preventive retrofit. In such way could go lost, for example, historical or archeological testimonials of the construction time and of the construction technique of then, through the replacement of historical construction materials with contemporary ones, deemed as more performant. This can happen in direct or indirect way (as in Asissi). In this contribution the results of an investigation and of a comparison regarding the maintenance of construction materials like wood, iron and reinforced concrete in historical buildings after the impact of historical earthquakes will be shown. As historical buildings will be those regarded, in which the respective construction material was largely employed in urban areas for housing. In detail the following examples will be considered: 1) half-timbered structures from the Alps and surroundings (Switzerland, southern Germany, Tirol and Alsace) since 1356 Basel earthquake and "Pombalino" buildings, since 1755 Lisbon earthquake; 2) residential buildings with iron (in moderate seismicity Germany) or steel skeleton (in strong seismicity Iran); 3) reinforced concrete buildings of the Modern Movement, in earthquake prone Bucharest (Romania), Athens (Greece), Northern Italy and Lisbon (Portugal). The possibilities to fulfil the criterium of the preservation of the historical urban built fabric in conservation were investigated.