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Lecture at UNICA in June 1st, 2011

Vibration-induced Effects on Buildings

The public awareness with respect to the uniqueness of its cultural heritage has increased significantly in the last decades in almost all countries in the world and became a special concern of the UNESCO.
Besides climate and weather, natural disasters and material aging **vibrations** can cause significant stresses in building materials. This material can be important for the structural robustness of parts of the building or can be important for some sensitive statues, wall paintings, plaster and so on inside the building. Typically, these vibrations are caused by any construction activities and heavy traffic.
As public transport becomes more and more important it happens rather often, that new traffic lines are build directly in the centers of old cities with a lot of historical buildings which sometimes contribute to the national identity. Thus, codes have been set up with vibration-levels which should not be exceeded for different categories of buildings and of vibrations: appearing continuously or only sometimes.
The lecture explains the background of these vibration levels, makes a comparison with temperature-induced stresses, presents some typical values from codes, shows the large variety of excitations due to train-traffic and gives some hints concerning the reduction of vibrations at the source by means of viscoelastic layers.
Finally, some comments will be added with respect to monitoring and 3 applications will be mentioned in short.