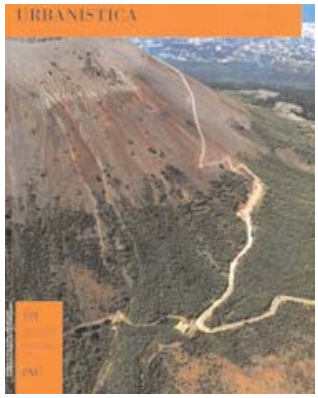

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Systemic vulnerability and seismic risk in the historical town of Naples

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The consciousness of the multiple damages, not only physical, but even functional, economic, social and systemic, suffered by a city after an earthquake, both in the short and long term, is connected, in scientific literature, to the multidimensionality of the vulnerability concept, interpreted as propensity of the city to be damaged by a seismic event.
The systemic vulnerability concept has different definitions and is generally used to highlight the incapacity of the urban system to cope with the seismic event and is referred to the relationships among urban sub-systems, to the functional dependency of urban areas, to the incapacity of the city to supply the population hit by the earthquake with activities and services.
Historical towns like Naples, characterized by dense and scarcely accessible urban fabrics with high population density, many relevant urban activities and high tourist flows, highlight such lacks of efficiency also due to low intensity earthquake.
The comparison among case-studies of historical towns hit by earthquakes and the detailed back-analysis of the Naples' 1980 event, allowed us to characterize the systemic damage as lack of efficiency of the urban system due to a demand for activities and services of the hit population, which cannot be supplied by the city because of its spatial and functional features.
The demand shows a 'wave' temporal course with the peak-point within 12 hours from the earthquake and refers to the access of rescue teams to urban areas and to the access of population to safe open spaces and to the main road network.
The method for systemic vulnerability assessment, developed by the Operative unit of the Dipist within the National research program *The safeguard of the historical, landscape and cultural heritage of the Italian seismic risk areas* 2002-2004, starts with the identification of territorial units homogeneous with respect to age, types and features of urban fabrics, which are drawn with respect to the census units boundaries.
The demand assessment is carried out taking into account the number of users both of residential and tertiary activities and of other relevant urban activities in each territorial unit. The supply assessment is carried out through indexes referred to the functional and spatial features of territorial units, such as the compactness of the urban fabric, the permeability of the road network, the accessibility of the rescue teams. Finally, the comparison between demand and supply allow us to single out 'critical' areas.
The systemic damage assessment requires the setting up of scenario techniques able to describe, in
spatial and temporal terms, the chains of events and impacts due to a seismic event. For this aim, a scenario referred to three phases: the earthquake, the first emergency (24 hours) and the first week after the event was set up.
The losses of efficiency referred to the residential system, to the access of the population to safe open spaces and to emergency health-care activities, were developed in the Naples case-study through a night scenario referred to the building damage distribution of the 1980 earthquake.
In the last phase of the work, planning strategies for risk mitigation, which could take place by steering the requalification policies towards mitigation objectives and avoiding public additional expenses, were outlined.