VULNERABILITY FOR INDUSTRIAL FACILITIES

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A vulnerability curve expresses the likelihood of damage when a risk (buildings/ infrastructure) is subjected to natural (floods, storms, earthquakes) or man-made (terrorism, political risk) disasters. Vulnerability curves are in general specific to risk, location, coverage type and building characteristics. They can be derived through analytical, empirical or hybrid processes and they define damage states in which certain failures are likely to be observed under specific ranges of loads. Vulnerability is a function of direct losses (physical damage to buildings and contents) and indirect losses (due to production disruption). The outcome of vulnerability functions can be used for a variety of business or academic purposes such as emergency response planning, risk mitigation and disaster management.

In the last years, vulnerability curves have become popular for assessing the structural capability of industrial structures with the best current practises being the use of non- linear dynamic, incremental dynamic and pushover analyses. In industrial risks, indirect losses are usually much greater when compared to direct losses and hence sometimes building characteristics can be ignored. The derivation of industrial vulnerability curves entails the classification of main production elements, the identification of dependencies and the elaboration of measurable variables. Available production data is subject to standardisation for consistency reasons, weighting which sets the relative importance of data to the overall vulnerability and aggregation which defines the final vulnerability data or range. Developed vulnerability functions are always subject to sensitivity checks and visualisation analysis and they are sources of epistemic uncertainty and expert judgement.