



Post-earthquake investigation of industrial facilities: Learning lessons to mitigate NATECH disasters

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Earthquakes pose a direct threat to the built environment: human losses caused by the collapse of buildings; technical incapacity caused by the failure of critical infrastructures; lasting economic slowdown due to the destruction of productive assets. In addition to these numerous, multifaceted impacts, earthquakes also endanger the physical integrity of industrial facilities. Seismic shocks have the potential to damage tanks, piping systems, control devices and warning/monitoring systems. Such damage can both trigger industrial accidents (explosion; fire) and pollution (leakage; spills), and limit the technical capacity of staff to cope with the ensuing emergencies.

Post-event investigation of earthquakes are a major source of static and dynamic information. Lessons learning indeed helps understand both the impacts of seismic shocks on technical systems (physical resistance and vulnerability of industrial plants), as well as the organization response provided by staff of affected facilities. Numerous studies of this nature and related working groups have taken place in the past, such as those conducted by the *French Association for Earthquake Engineering* (AFPS) and the *National Institute for Environment and Industrial Risks* (INERIS). AFPS investigations have been conducted in Europe, Asia, South America etc. and INERIS studied the impacts of the Izmit earthquake on industrial facilities.

Although conducted on the best available knowledge and technical expertise, these studies might have followed slightly different methodological paths. This communication therefore is an attempt to integrate the lessons learned from these major studies, by drafting consolidated terms of reference for post-earthquake investigation of industrial facilities. Both structural and organisational aspects shall be addressed. Expert

interviews, secondary material accumulated by AFPS and INERIS, and a comparison of technical regulations serve as basis for this communication.