Learning lessons from Natech accidents – the eNATECH accident database

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When natural hazards impact industrial facilities that house or process hazardous materials, fires, explosions and toxic releases can occur. This type of accident is commonly referred to as Natech accident. In order to prevent the recurrence of accidents or to better mitigate their consequences, lessons-learned type studies using available accident data are usually carried out. Through post-accident analysis, conclusions can be drawn on the most common damage and failure modes and hazmat release paths, particularly vulnerable storage and process equipment, and the hazardous materials most commonly involved in these types of accidents. These analyses also lend themselves to identifying technical and organisational risk-reduction measures that require improvement or are missing.

Industrial accident databases are commonly used for retrieving sets of Natech accident case histories for further analysis. These databases contain accident data from the open literature, government authorities or in-company sources. The quality of reported information is not uniform and exhibits different levels of detail and accuracy. This is due to the difficulty of finding qualified information sources, especially in situations where accident reporting by the industry or by authorities is not compulsory, e.g. when spill quantities are below the reporting threshold. Data collection has then to rely on voluntary record keeping often by non-experts.

The level of detail is particularly non-uniform for Natech accident data depending on whether the consequences of the Natech event were major or minor, and whether comprehensive information was available for reporting. In addition to the reporting bias towards high-consequence events, industrial accident databases frequently lack information on the severity of the triggering natural hazard, as well as on failure modes that led to the hazmat release. This makes it difficult to reconstruct the dynamics of the accident and renders the development of equipment vulnerability models linking the natural-hazard severity to the observed damage almost impossible. As a consequence, the European Commission has set up the eNATECH database for the systematic collection of Natech accident data and near misses. The database exhibits the more sophisticated accident representation required to capture the characteristics of Natech events and is publicly accessible at http://enatech.jrc.ec.europa.eu.

This presentation outlines the general lessons-learning process, introduces the eNATECH database and its specific structure, and discusses natural-hazard specific lessons learned and features common to Natech accidents triggered by different natural hazards.