



Historical analysis of US pipeline accidents triggered by natural hazards

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Natural hazards, such as earthquakes, floods, landslides, or lightning, can initiate accidents in oil and gas pipelines with potentially major consequences on the population or the environment due to toxic releases, fires and explosions. Accidents of this type are also referred to as Natech events. Many major accidents highlight the risk associated with natural-hazard impact on pipelines transporting dangerous substances. For instance, in the USA in 1994, flooding of the San Jacinto River caused the rupture of 8 and the undermining of 29 pipelines by the floodwaters. About 5.5 million litres of petroleum and related products were spilled into the river and ignited. As a result, 547 people were injured and significant environmental damage occurred.

Post-incident analysis is a valuable tool for better understanding the causes, dynamics and impacts of pipeline Natech accidents in support of future accident prevention and mitigation. Therefore, data on onshore hazardous-liquid pipeline accidents collected by the US Pipeline and Hazardous Materials Safety Administration (PHMSA) was analysed. For this purpose, a database-driven incident data analysis system was developed to aid the rapid review and categorization of PHMSA incident reports. Using an automated data-mining process followed by a peer review of the incident records and supported by natural hazard databases and external information sources, the pipeline Natechs were identified. As a by-product of the data-collection process, the database now includes over 800,000 incidents from all causes in industrial and transportation activities, which are automatically classified in the same way as the PHMSA record.

This presentation describes the data collection and reviewing steps conducted during the study, provides information on the developed database and data analysis tools, and reports the findings of a statistical analysis of the identified hazardous liquid pipeline incidents in terms of accident dynamics and consequences.