



Mapping Natech risk due to earthquakes using RAPID-N

Serkan Girgin and Elisabeth Krausmann

European Commission, Joint Research Centre, Via E. Fermi 2749, 21027 Ispra (VA), Italy (serkan.girgin@jrc.ec.europa.eu, elisabeth.krausmann@jrc.ec.europa.eu)

Natural hazard-triggered technological accidents (so-called Natech accidents) at hazardous installations are an emerging risk with possibly serious consequences due to the potential for release of hazardous materials, fires or explosions. For the reduction of Natech risk, one of the highest priority needs is the identification of Natech-prone areas and the systematic assessment of Natech risks. With hardly any Natech risk maps existing within the EU the European Commission's Joint Research Centre has developed a Natech risk analysis and mapping tool called RAPID-N, that estimates the overall risk of natural-hazard impact to industrial installations and its possible consequences. The results are presented as risk summary reports and interactive risk maps which can be used for decision making. Currently, RAPID-N focuses on Natech risk due to earthquakes at industrial installations. However, it will be extended to also analyse and map Natech risk due to floods in the near future.

The RAPID-N methodology is based on the estimation of on-site natural hazard parameters, use of fragility curves to determine damage probabilities of plant units for various damage states, and the calculation of spatial extent, severity, and probability of Natech events potentially triggered by the natural hazard. The methodology was implemented as a web-based risk assessment and mapping software tool which allows easy data entry, rapid local or regional risk assessment and mapping. RAPID-N features an innovative property estimation framework to calculate on-site natural hazard parameters, industrial plant and plant unit characteristics, and hazardous substance properties. Custom damage states and fragility curves can be defined for different types of plant units. Conditional relationships can be specified between damage states and Natech risk states, which describe probable Natech event scenarios. Natech consequences are assessed using a custom implementation of U.S. EPA's Risk Management Program (RMP) Guidance for Offsite Consequence Analysis methodology. This custom implementation is based on the property estimation framework and allows the easy modification of model parameters and the substitution of equations with alternatives.

RAPID-N can be applied at different stages of the Natech risk management process: It allows on the one hand the analysis of hypothetical Natech scenarios to prevent or prepare for a Natech accident by supporting land-use and emergency planning. On the other hand, once a natural disaster occurs RAPID-N can be used for rapidly locating facilities with potential Natech accident damage based on actual natural-hazard information. This provides a means to warn the population in the vicinity of the facilities in a timely manner.

This presentation will introduce the specific features of RAPID-N and show the use of the tool by application to a case-study area.